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The American Society of Hospital Pharmacists, an affiliate of the American Pharmaceutical Association, is a national organization devoted to the profession of hospital pharmacy and dedicated to the improvement of pharmaceutical service in the interest of better patient care in hospitals.

MEMBERSHIP in the American Society of Hospital Pharmacists and the American Pharmaceutical Association is open to all practicing hospital pharmacists. With membership are included subscriptions to the American Journal of Hospital Pharmacy and to the *Journal* of the American Pharmaceutical Association, Pract. Pharm. Ed., as well as the several services of each organization.

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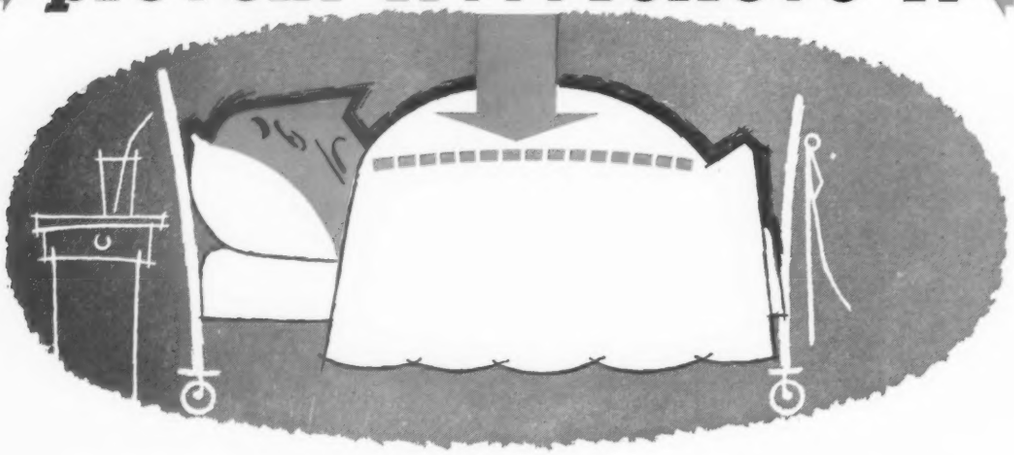

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News

New ASHP Officers Named

William M. Heller

Vernon O. Trygstad

Sister Mary Berenice, S. S. M.

Gloria Francke

William M. Heller, Chief Pharmacist at the University Hospital, University of Arkansas Medical Center and Assistant Professor at the University of Arkansas School of Pharmacy, Little Rock, has been named President of the AMERICAN SOCIETY OF HOSPITAL PHARMACISTS for the 1959-1960 term. The Vice-President-Elect is Vernon O. Trygstad, Director of Pharmacy Service of the Veterans Administration's Department of Medicine and Surgery in Washington, D. C. The Treasurer-Elect is Sister Mary Berenice, S.S.M., Director of Pharmacy Service at the St. Mary's Group of Hospitals, St. Louis, Missouri and Director of the Hospital Pharmacy Internship Program in these hospitals, St. Louis. Sister Mary Berenice will serve for a three year term beginning with the 1959 Annual Meeting. The Secretary, who is nominated by the ASHP Executive Committee and elected by the House of Delegates, is Gloria Niemeyer Francke who was re-elected to serve for a three year term beginning with the 1958 Annual Meeting.

The President-Elect, William M. Heller, is well known to ASHP members for his many activities during the past several years. He is currently Chairman of the Committee on Pharmacy and Pharmaceuticals and Director of the *American Hospital Formulary Service*. He is also a co-author of the first, second and third Supplements to the *Comprehensive Bibliography on Hospital Pharmacy* which has been published in THE BULLETIN OF THE AMERICAN SOCIETY OF HOSPITAL PHARMACISTS. The Vice-President-Elect, Vernon O. Trygstad, is also well known to SOCIETY members and has been active in developing pharmaceutical services in the Veterans Administration hospitals throughout the country. He did outstanding work on the Committee on Narcotic Regulations from which was developed the "Suggested Regulations for Handling Narcotics in Hospitals," made available through the SOCIETY.

Sister Mary Berenice has had long experience on the ASHP Executive Committee, having served previously as Treasurer and also a term as chairman of the Committee on Minimum Standards. She is a charter member of the ASHP and a life member of the American Pharmaceutical Association.

The Secretary, Gloria Francke, has been closely associated with the SOCIETY since 1944, first as an associate editor of THE BULLETIN and later as Assistant Director of the Division of Hospital Pharmacy of the A.Ph.A. and the ASHP. She was first elected Secretary of the SOCIETY in 1949 and has served in this capacity since that time.

The officers named above, with the exception of the Secretary, will be installed during the ASHP Annual Meeting to be held in connection with the Convention of the American Pharmaceutical Association in Cincinnati during the week of April 19, 1959. The Secretary was installed at the 1958 Annual Meeting in Los Angeles.

The ballots of the recent election were counted by a Board of Canvassers, consisting of four ASHP members appointed by President Robert Bogash. Included on the Board of Canvassers were Franklin Cooper, George Washington University Hospital, Washington, D. C.; Milton Skolaut, Clinical Center, National Institutes of Health, Bethesda, Md.; Russell Fiske, Medical College of Virginia Hospital, Richmond, Va.; and Herbert Carlin, Jefferson Medical College Hospital, Philadelphia, Pa.

The present officers of the AMERICAN SOCIETY OF HOSPITAL PHARMACISTS, who will continue to function until the Annual Meeting in April are: President, Robert Bogash, New York, N. Y.; Vice-President, Clifton J. Latiolais, Columbus, Ohio; Secretary, Gloria Francke, Ann Arbor, Mich.; and Treasurer, Sister Mary Berenice, St. Louis, Mo.

Hospital Pharmacists Elected to A.Ph.A. Council

George F. Archambault and Leo F. Godley, both past presidents of the AMERICAN SOCIETY OF HOSPITAL

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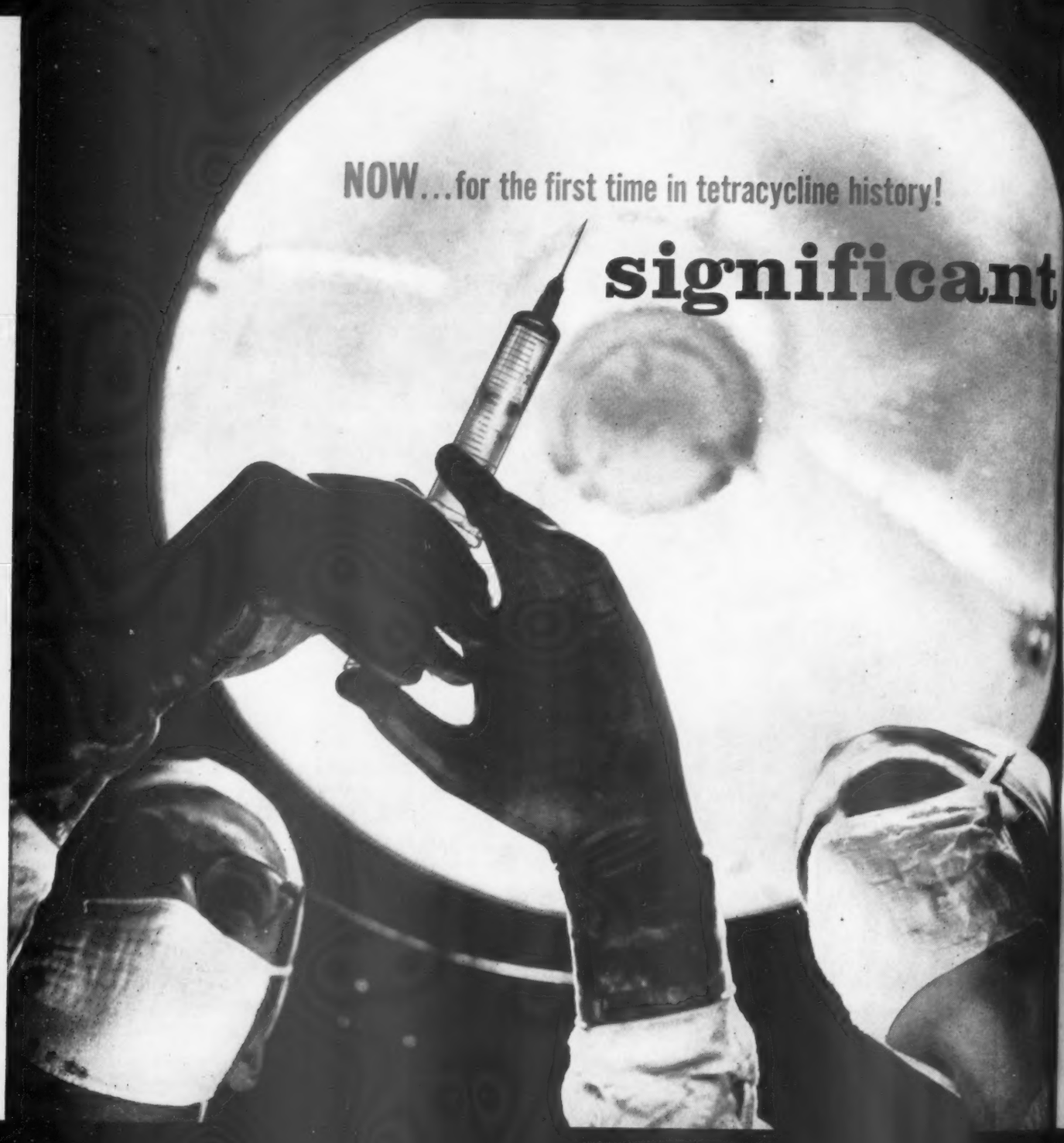

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News

CONTINUED FROM PAGE 833

PHARMACISTS, have been elected to the A.Ph.A. Council. Dr. Archambault, was re-elected for another three year term to the council and Mr. Leo F. Godley was named First Vice-President. Dr. Archambault is Chief, Pharmacy Branch, United States Public Health Service, Washington, D. C. and Leo F. Godley is Chief Pharmacist at Harris Hospital, Fort Worth, Texas.

Other officers of the A.Ph.A. elected to serve during the 1959-1960 term include Howard C. Newton, President, Boston, Mass.; Paul W. Wilcox, Second Vice-President, West Point, Pa.; and other new members of the Council include Robert P. Fischelis, Washington, D. C.; and Leroy A. Weidle, Jr., St. Louis, Mo.

The officers named above will be installed at the Annual Convention of the A.Ph.A. which will be held in Cincinnati, Ohio during the week of April 19, 1959.

The present officers of the American Pharmaceutical Association, elected by mail ballot, who will continue to function through the Cincinnati Convention, April 19-25, 1959, are: President, Louis J. Fischl, Oakland, California; First Vice-President, Stephen Wilson, Detroit, Michigan; and Second Vice-President, Howell R. Jordan, Austin, Texas.

1959 Annual Meeting

Plans are being made for the 1959 Annual Meeting of the AMERICAN SOCIETY OF HOSPITAL PHARMACISTS scheduled in Cincinnati, April 19, 20, and 21, 1959. Meetings will be held in conjunction with the Convention of the American Pharmaceutical Association which will be held throughout the week.

Hospital pharmacists wishing to contribute papers for presentation at the ASHP General Sessions are urged to communicate *immediately* with Mr. Allen Beck, Chairman of the SOCIETY's Committee on Program and Public Relations. Mr. Beck's address is: Indiana University Medical Center, Indianapolis, Indiana. The deadline for receiving contributed papers for the 1959 Annual Meeting is *November 30*.

Further information regarding the 1959 Convention of the A.Ph.A. and the Annual Meeting of the ASHP will be sent to members and programs will be published in the journals early in the year.

Sister Teresa Honored

Sister Mary Teresa

Sister Mary Teresa, Director of Pharmacy Service at St. Anthony Hospital in Oklahoma City, was named the 1958 "Outstanding Pharmacist" by the University of Oklahoma Pharmacy Alumni Association. The presentation was made at the annual banquet of the Oklahoma Pharmaceutical Association meeting at the Skirvin Tower Hotel in Oklahoma City in June.

Sister Mary Teresa has long been active in both the AMERICAN SOCIETY OF HOSPITAL PHARMACISTS and the Oklahoma Society, the latter group of which she was instrumental in organizing. She has served as Secretary of the Oklahoma Society and is immediate Past President.

This summer, Sister Teresa was given the opportunity to visit relatives and immediate family in Germany and, at the same time, attended the 17th Congress of the International Pharmaceutical Federation in Brussels, Belgium.

A.H.A. Representatives on Joint Committee

W. Kevin Hegarty, Greater Bakersfield Memorial Hospital, Bakersfield, California, has been named a new member of the Joint Committee of the American Hospital Association and AMERICAN SOCIETY OF HOSPITAL PHARMACISTS. Other A.H.A. representatives, along with the expiration time indicated, are Robert R. Cadmus, M.D., North Carolina Memorial Hospital, Chapel Hill, North Carolina (1960); C. P. Cardwell, Jr., Medical College of Virginia, Hospital Division, Richmond 19, Virginia (1959); and John J. Zugich, University Hospital, Ann Arbor, Michigan (1959).

ASHP representatives currently serving on the Committee include Robert C. Bogash, Lenox Hill Hospital, New York, New York; George F. Archambault, U. S. Public Health Service, Washington, D. C.; Grover C. Bowles, Baptist Memorial Hospital, Memphis, Tennessee; and Clifton J. Latiolais, Ohio State University Health Center, Columbus, Ohio. The Secretary of the SOCIETY, Gloria N. Francke, Ann Arbor, Michigan serves as an ex-officio member.

Other ex-officio members of the Committee include Joseph Oddis, Council on Professional Practice, American Hospital Association, Chicago, Illinois; and Paul F. Parker, Division of Hospital Pharmacy, American Pharmaceutical Association, Washington, D. C. Dr. George Archambault is currently serving as Chairman of the Committee and Mr. Joseph Oddis as Secretary.

CONTINUED ON PAGE 842

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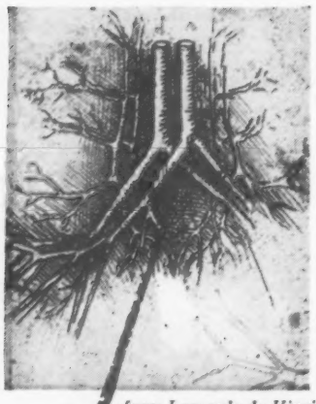

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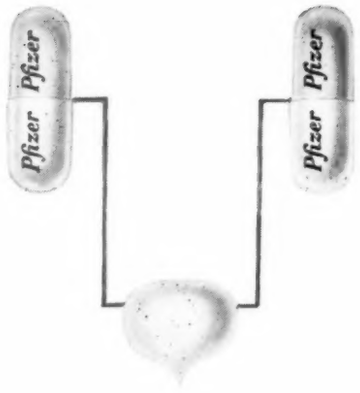

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REFERENCES: **Bourque, J. P.,** and **Joyal, J.:** A Clinical Study of a New Sulfonamide in the Treatment of Urinary Infections, Canad. M. A. J. **68**:337, 1953. **Trafton, H. M.,** and **Lind, H. E.:** Urinary Infections, Clinical and Bacteriological Cure with Terramycin, J. Urol. **69**:315, 1953. **Musselman, M. M.:** Terramycin, Antibiotics Monographs No. 6, New York, Medical Encyclopedia, Inc., 1956. **Longley, J. R.:** Oxytetracycline Therapy in Surgery and Infections of the Urinary Tract, Antibiotics Annual 1955-1956, New York, Medical Encyclopedia, Inc., 1956, p. 358.

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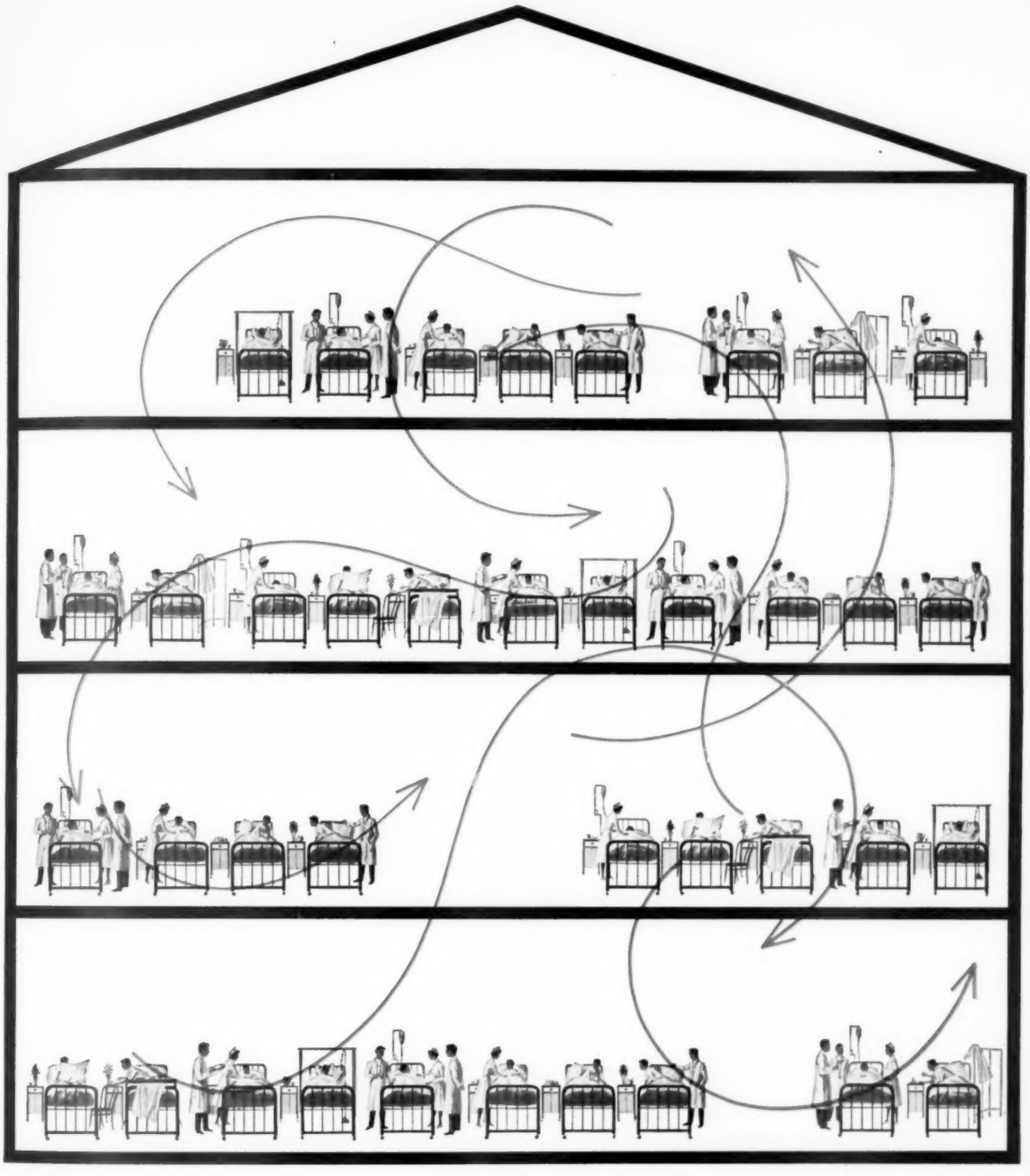

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News

CONTINUED FROM PAGE 836

Mrs. Florence Frick Appointed to Rutgers' Board of Governors

Mrs. Florence Sena Frick has been appointed to the Board of Governors of the Rutgers University Alumni Federation. Mrs. Frick, Pharmacist at Presbyterian Hospital (a unit of the United Hospitals of Newark), Newark, New Jersey, is also a Trustee of the Rutgers College of Pharmacy Alumni Association. Mrs. Frick is also presently serving as Secretary of the New Jersey Society of Hospital Pharmacists.

New England Council of Hospital Pharmacists

The New England Council of Hospital Pharmacists is holding its fourth annual Seminar on October 21 and 22 in Worcester, Massachusetts. The Council brings together hospital pharmacists from the New England States with representatives from the various chapters rotating as officers. This year Mr. John W. Webb, Assistant Pharmacist-in-Chief at the Massachusetts General Hospital, Boston is in charge of the program.

Highlights of the meeting include a talk on "Work Simplification" by Harold G. Dunlap, Director of Work Simplification, H. P. Hood and Sons, Boston; a talk on "Endocrinology" by Maurice M. Pechet, M.D., Massachusetts General Hospital, Boston; and a discussion on "Pharmacology in Relation to the Therapeutics Committee" by O. James Inashima, New England College of Pharmacy, Boston. There will also be a discussion on a "Pricing Survey" by Alfred A. Rosenberg, Chief Pharmacist at Brighton Marine U. S. Public Health Service Hospital, Boston, and a discussion on "Minimum Standards" by Norman R. Caron, Chief Phamacist at St. Luke's Hospital, New Bedford, Massachusetts. Mr. Louis J. Rossetti, a retail pharmacist in Boston, will moderate a panel on "Hospital Formularies." Other participants include Robert A. Hardt, President of the Pharmaceutical Division of Armour and Company, Chicago, representing industry; Sister Margaret Rosita, representing hospital administration; John T. Murphy, Massachusetts General Hospital, representing the hospital pharmacist; and Dale G. Friend, M.D., Peter Bent Brigham Hospital, Boston, representing the physician and the therapeutics committee. There will also be a discussion on "Blue Cross" by Roland A. McNitt, Director of Public Relations, Massachusetts Blue Cross and Blue Shield.

The meeting will be held at Hotel Bancroft, in Worcester, starting Tuesday, October 21 at 10:00 a.m.

Residents at Jefferson Medical College Honored

Residents Honored at Jefferson Medical College Hospital

Certificates of service showing completion of the Residency Program in Pharmacy were presented to participants in the Hospital Pharmacy Administration Program offered jointly by Jefferson Medical College Hospital and Philadelphia College of Pharmacy and Science, Philadelphia, Pa. Residents receiving the certificate included Alan L. Lister, Fred G. Salfi, Charles M. King, Jr., and Herbert S. Carlin. Herbert L. Flack is Director of Pharmacy Service at Jefferson Medical College Hospital and Linwood F. Tice is Associate Dean of the Philadelphia College of Pharmacy and Science. The awards were made by Dr. E. R. Browneller, Medical Director of Jefferson Medical College Hospital and Dr. Tice.

To date, 24 registered pharmacists have completed the specialized program offered at the Jefferson Medical College Hospital in cooperation with the Philadelphia College of Pharmacy and Science.

Licensure Statistics for 1957 Published

The National Association of Boards of Pharmacy has recently published a summary entitled "Licensure Statistics for Calendar Year 1957 and Census of Pharmacy as of January 1, 1958." This information, compiled from statistics acquired from the secretaries of state boards of pharmacy, provides helpful information on the number of pharmacists practicing and their respective fields. Of interest to hospital pharmacists is the fact that 4,072 or 3.9 percent of all pharmacists practicing were reported in hospital pharmacies. Also, under "Outlets of Distribution" 1,876 hospital pharmacies are reported. It should be kept in mind that in each instance records for several states are not included. This accounts for the lower figures shown here.

It is also noted that a commentary on the data presented in the compilation appears in the July,

August, September 1958 issue of the *N.A.B.P. Bulletin.* Both of these publications are available from the National Association of Boards of Pharmacy, 77 West Washington Street, Chicago 2, Illinois.

Executive Committee Meets

The ASHP Executive Committee will meet at the Indiana University Medical Center, Indianapolis on October 23. Among the principal items of business to be covered include the Formulary Service, work of the Committee on Research and Development, plans for 1959 Annual Meeting, SOCIETY finances, and reports from the various officers and committees.

A report of the meeting including actions taken will appear in a forthcoming issue of the JOURNAL.

► *Mr. Edward C. Watts,* a charter member of the AMERICAN SOCIETY OF HOSPITAL PHARMACISTS, died on July 26 at the Chateau Champlain in Scarsdale, New York. Mr. Watts retired in 1956 as head of the Pharmacy Department at the St. Luke's Hospital in New York City. Prior to that time he had been Assistant Chief Pharmacist at University Hospital in Ann Arbor, Michigan. He was graduated from the University of Michigan College of Pharmacy.

Remington Award to Eli Lilly

The New York Branch of the American Pharmaceutical Association has announced that the 1958 Remington Honor Medal will be presented to Eli Lilly of Indianapolis, at the Remington Dinner which will be held on Wednesday evening, December 10, 1958 at the Hotel Roosevelt in New York City at 7 o'clock.

Mr. Lilly, Chairman of the Board of Directors of Eli Lilly and Company, has been named recipient of the Remington Honor Medal for 1958 by the Remington Medal Award Committee which consists of the past presidents of the American Pharmaceutical Association. The Committee on Arrangements is headed by Chairman Irving Rubin, Managing Editor of *American Druggist* and immediate Past-President of the New York Branch; Dr. E. E. Leuallen, Co-Chairman and Branch Secretary, and Mr. Harry Kaye, Financial Chairman and Branch Treasurer.

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*Obtained from metabolic conversion of acetate ion.

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Calcium	5 mEq.		
Magnesium	3 mEq.		

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1. Dripps, R.C.: Hazards of the Immediate Postoperative Period, J.A.M.A. 7:795 (Oct. 19, 1957). [This reference reviews postoperative hazards, and does not refer to Adrenosem Salicylate].

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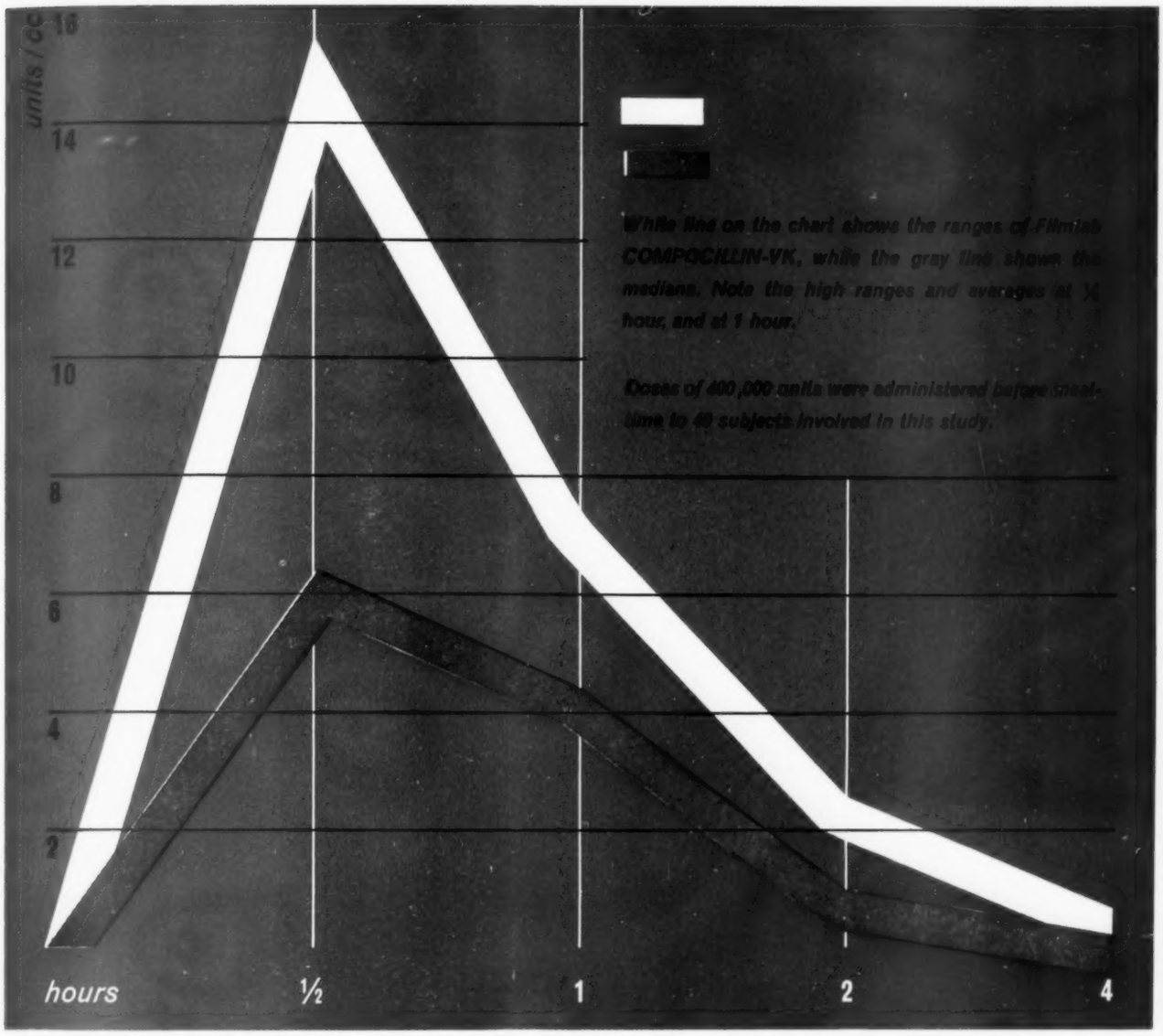

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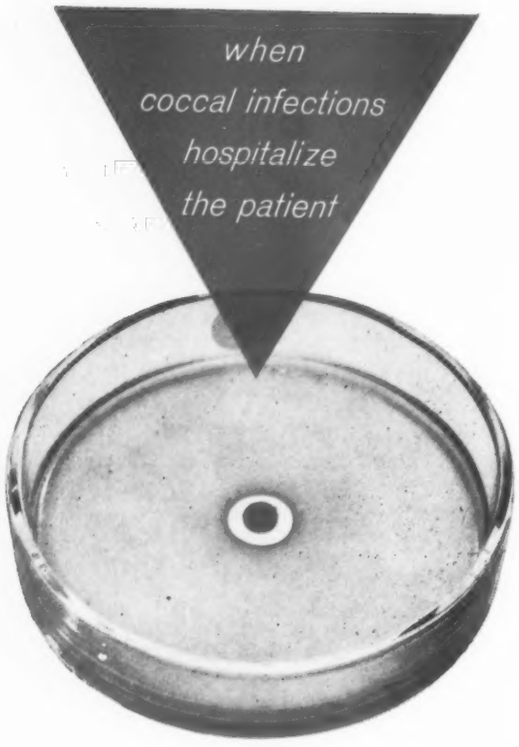

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1. Antibiotics Annual, 1956-'57, p. 706.
2. Antibiotics Annual, 1957,-'58, p. 180-7.

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Michigan Society

The Michigan Society of Hospital Pharmacists has scheduled a Hospital Pharmacy Seminar for Saturday, November 22 in Detroit. The meetings will be held in cooperation with the College of Pharmacy at Wayne State University and Pfizer Laboratories. Sessions are scheduled at the McGregor Memorial Conference Center, Wayne State University Campus, Detroit.

Members of the Michigan Society of Hospital Pharmacists met for the first Fall meeting on Thursday, September 18 at St. Joseph Mercy Hospital in Pontiac. Sister Mary William, Administrator and Mr. Adam J. Stark, Chief Pharmacist, acted as hosts to a group of more than 50 hospital pharmacists.

The program included a talk on "The Role of Pathologist-Pharmacist Relations in Hospitals," by Dr. Richard E. Olsen, Pathologist at St. Joseph Mercy Hospital and a paper on "Treatment of Iron Deficiency Anemias," by Dr. Julian Rutzky, Director of Clinical Laboratories at St. Joseph Mercy Hospital.

Business transacted during the meeting covered plans for a seminar which is scheduled for November 22 and consideration of plans for presentation of the Harvey A. K. Whitney Lecture Award at the 1959 Annual Meeting of the ASHP.

Northern California Society

The Northern California Society of Hospital Pharmacists met on Tuesday, August 12 at the U. S. Public Health Service Hospital in San Francisco. Dr. Kathleen Roberts was guest speaker and presented a talk on "Electrolytes."

Also included on the program was an audio-visual demonstration on prescription writing which was prepared by Mr. William Dudley of the U. S. Public Health Service Hospital in San Francisco.

New members introduced during the meeting included Lt. Katherine Keating, Oak Knoll Hospital in San Francisco and Commander Philbrook H. Knight, U. S. Public Health Service Hospital in San Francisco.

At the September 9 meeting of the Northern California Society held at the Fairmont Hospital Canteen in San Leandro, Dr. Robert MacRoberts spoke on "Medical Hypnosis." The history of hypnosis was first described, followed by its medical usage. Dr. MacRoberts explained terms such as suggestability, trance, hypnosis, and the hypnotic state. Several laws of hypnosis have been established, such as concentrated tension, reversed effort, auto hypnosis, age regression, automatic writing and time distortion. A question and answer period followed.

A new member of the Society, Mr. Kenneth Letcher, an intern in hospital pharmacy at the University of California Hospital, was introduced.

Louisiana Society

The Louisiana Society of Hospital Pharmacists scheduled a Seminar in cooperation with Pfizer Laboratories for October 18. Principal speakers included Mr. Robert Bogash, President of the ASHP; E. Burns Geiger, Director, Professional Relations, Pfizer Laboratories; Dr. Josephine Siragusa, Loyola University School of Pharmacy, New Orleans; Gladys Herbert, Charity Hospital, New Orleans; Ben Bavly, Hospital Drug Store, New Orleans; and Frank W. Hollister, U. S. Public Health Service Hospital, New Orleans. Following the discussions, a panel was moderated by John Benedict, Oschner Foundation Hospital, New Orleans. Seminar coordinators included William O'Brien, representing the Louisiana Society of Hospital Pharmacists and Clifford Caddis, representing Pfizer Laboratories.

Washington State Hospital Pharmacists

The first fall meeting of the Washington State Hospital Pharmacists group was held on Tuesday, September 9 in Bagley Hall at the University of Washington. The President, Mr. Frank Dondero, welcomed the 32 members in attendance and then introduced the main speaker, Dr. Jack Orr, Dean of the College of Pharmacy, University of Washington, who spoke on "The New University Hospital Pharmacy."

During the business session, numerous communications from representatives of the national organization were presented. Plans were made for participating in several committee activities which will be reported to the national group. Committee chairmen appointed to serve during the coming year include the following: *Constitution*: James Button; *Membership*: Theodore Taniguchi; and *Journal Club*: Bernard Shleien.

On the resignation of Mr. Paul Breen, Vice-President, it was necessary to elect a replacement. Mr. Wilfred Knight was elected Vice-President to serve during the coming year.

During the meeting, plans were also outlined for the forthcoming seminar which is scheduled for October 11.

Southern Appalachian Society

The Southern Appalachian Society of Hospital Pharmacists recently organized in the Southwest West Virginia and Eastern Kentucky area, has applied for affiliation with the American Society of Hospital Pharmacists. Reporting 18 members, the group has named E. W. Nollau of Williamson, West Virginia as President; Darrell Richmond of Charleston, West Virginia as First Vice-President; Joseph Silverman of Harlan, Kentucky as Second Vice-President; Morris A. Freedman of Charleston, West Virginia as Secretary; and Robert Sperry of Beckley, West Virginia as Treasurer.

The application along with the other necessary information is being submitted to the Executive Committee for approval.

Western Pennsylvania Society

Social events of the Western Pennsylvania Society of Hospital Pharmacists always include the Annual Picnic which was held this year on June 25th at the Community House of South Park, Pittsburgh.

Four of the members attended the Institute on Hospital Pharmacy in Philadelphia during June. They were: Rosemarie Slavonic, St. Clair Memorial Hospital, Pittsburgh; John Ponas, Conemaugh Valley Memorial Hospital, Johnstown; James Sandala, West Penn Hospital, Pittsburgh; and Anne Marie Peters, Allegheny General Hospital, Pittsburgh. A fifth member, Sister M. Gonzales of Mercy Hospital,

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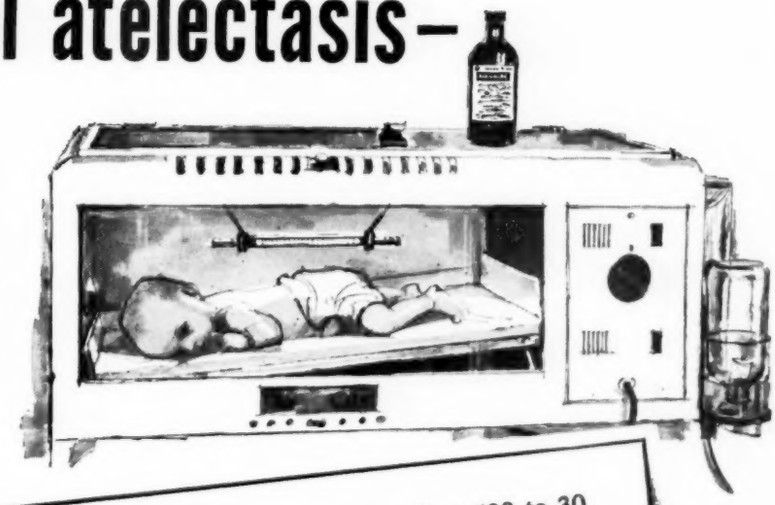

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- poliomyelitis (respiratory complications)
- routine oxygen therapy • tracheotomy
- prevention of postoperative pulmonary complications

*Smessaert, Andre; Collins, V. J.; and Krocum, V. D.: New York Jour. Med., 55:1587, June 1, 1955.

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Pittsburgh was a member of the faculty for both the Philadelphia and Chicago Institutes.

Plans for the fall include: the Annual Seminar to be held in October at the Carlton House Hotel with Dr. William Heller, Mr. Grover C. Bowles and President Robert C. Bogash as speakers. A joint meeting with the Allegheny County Pharmaceutical Association is scheduled in November.

Northeastern New York Society

The Annual Installation Dinner of the Northwestern New York Society of Hospital Pharmacists was held on Saturday, June 14, 1958 at Sky View Lodge, New Scotland, New York.

Cocktails and dinner were enjoyed by 72 members and guests. Mr. Kenneth Griswold, Vice-President of the Board of Trustees, Albany College of Pharmacy, guest speaker of the evening, spoke on "Hospital Pharmacy in a College Curriculum." Dr. Francis O'Brien, Dean of the Albany College of Pharmacy, served as toastmaster for the evening. Dr. O'Brien also installed the new officers.

Southeastern New York State Chapter

Professor Isidore Greenberg, Assistant Professor of Pharmacy Administration at the Brooklyn College of Pharmacy and Long Island University, was the principal speaker at the June 19 meeting of the Southeastern New York State Chapter of the American Society of Hospital Pharmacists. The meeting was held at Mt. Sinai Hospital and President Norman Baker presided.

In the discussion by Professor Greenberg, he spoke of a study of per-patient day costs of medications in hospitals. The wide variance that existed in the figures quoted by a number of New York hospitals was discussed and various factors causing such a discrepancy in per-patient day drug costs were analyzed. A system as recommended by Professor Greenberg as a possible solution to this problem was reviewed, utilizing I.B.M. cards for all orders, receipts and disbursements of medications, both from nursing floors and the pharmacy department. Such a system would provide the pharmacists and hospital administrators with a constant check and report on the use of medications by hospitals, and the breakdown of the monies involved. A short question and answer period followed.

Business transacted at the meeting included a report on the Annual Meeting of the ASHP held in Los Angeles by Mr. Leo Blackman. Also, Committee appointments were made and there was discussion regarding a change in the Constitution and By-Laws affecting participating members. In accordance with a request from the national organizations, the President appointed a Special Projects Committee to make a study of the Minimum Standard for Pharmacies in Hospitals.

Southeastern Society

Gilbert Colina

Gilbert Colina, Chief Pharmacist at Mercy Hospital in Charlotte, North Carolina, has recently been elected president of the Southeastern Society of Hospital Pharmacists according to Jack Kirkland, the present president of the Society. Mr. Colina has been active in both retail and hospital pharmaceutical associations for a number of years.

Other officers announced were: Perry W. Cox, Chief Pharmacist of Carraway Methodist Hospital, Birmingham, Vice-President; and Mary Wernersbach, Chief Pharmacist, Mt. Sinai Hospital, Miami Beach, Secretary-Treasurer.

The Society will hold its next annual meeting in April in conjunction with the Southeastern Hospital Conference in Atlanta, Georgia.

New Jersey Society

At the Executive Committee meeting of the New Jersey Society of Hospital Pharmacists, plans were completed for a one day Hospital Pharmacy Seminar to be held on Saturday, September 27, 1958 at Rutgers University Campus, New Brunswick, New Jersey.

This Seminar was sponsored jointly by the New Jersey Society of Hospital Pharmacists and the Pfizer Laboratories in cooperation with the Rutgers University College of Pharmacy.

Invitations to attend the Seminar were sent to all hospital pharmacists, administrators and directors of nursing service in the New Jersey area.

Members present at the Executive Committee meeting were Sister Marian, Rudolph Wilhelm, Henry Roche, Eugene Von Stanley and Florence Frick who met with representatives of Rutgers University including Dr. Roy A. Bowers, Dean of College of Pharmacy, Dr. John L. Voigt and Professor Michael Iannarone. Mr. E. Burns Geiger represented the Pfizer Laboratories.

Mr. Paul L. Sullivan, Director of Professional Relations for Pfizer Laboratories assisted Mr. Geiger and worked with Florence S. Frick, Secretary, in the completion of the program.

Ohio Society

The Ohio Society of Hospital Pharmacists is meeting in Toledo on October 15. Sessions are to be held ot the Mercy Hospital School of Nursing beginning at 9:30 a.m.

Minnesota Hospital Pharmacy Association

The Minnesota Hospital Pharmacy Association in cooperation with Pfizer Laboratories sponsored a Seminar in May which was attended by 80 pharmacists from the Minnesota and surrounding areas. The program consisted of talks on "The Minnesota Poison Control," by Warren Lawson, M.D., M.P.H. Director of Minnesota Department of Health; "Narcotic Control in the Hospital Pharmacy," by Grover C. Bowles, Chief Pharmacist, Baptist Memorial Hospital, Memphis, Tennessee; "Pharmacology of Diuretics," by Harold N. Wright, Ph.D., Department of Pharmacology, University of Minnesota; "Hospital Pharmacy," by Grover C. Bowles; and "Effective Communications," by E. Burns Geiger, Director of Hospital Sales and Promotion of Pfizer Laboratories. Following the talks there was an open discussion with Mr. Bowles serving as moderator.

Secretaries of ASHP Affiliated Chapters are urged to send reports of meetings to the national secretary promptly. Since the American Journal of Hospital Pharmacy will appear on a monthly basis, reports must be received within five days after the meeting in order to be included in the forthcoming issue. We urge you to send details of the activities of your chapter for publication in this column.

Further, any suggestions which members have with regard to expanding this column in the interest of Affiliated Chapters, will be appreciated.

Everybody's talking about Staph...

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(Editor's note: In fact, staph infection can pave the way for strep infection, too. If strep gets into a wound with antibiotic-resistant staph ... parenteral penicillin won't stop or prevent strep infection even when the strep organisms are penicillin sensitive.)

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NEW MEMBERS

The following ASHP members sponsored the New Members listed in this issue of the JOURNAL. *The officers of the* SOCIETY *and the Committee on Membership and Organization appreciate the efforts of the individuals who have encouraged New Members to join the national organizations. Sponsors will be listed along with the New Members in each issue of the* JOURNAL.

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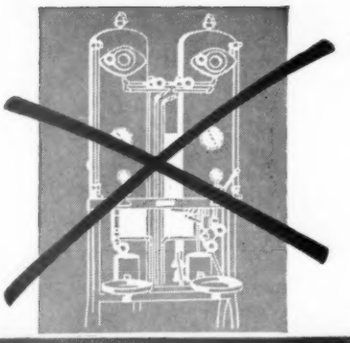

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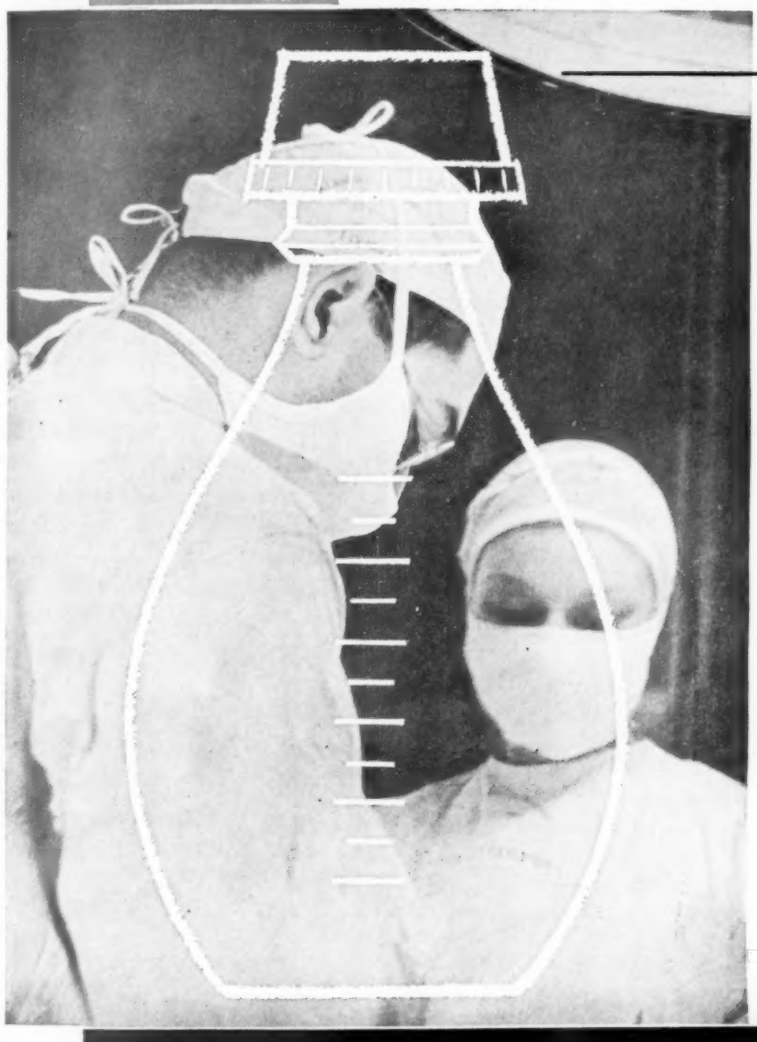

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Why HEPARIN?

Heparin is the body's own anticoagulant. It is a substance which is essential in maintaining the fluidity of circulating blood and is found in all mammalian tissues. Heparin is produced in the body by mast cells which occur in perivascular connective tissue everywhere. It is found in greatest abundance in the liver and lungs. The therapeutic usage of heparin is based upon its property to inhibit the coagulation of the blood. Its timely administration will prevent thrombosis, and, even if administered after thrombosis has set in, it will prevent further propagation of the clot. In all conditions in which thrombosis or the extension of an already existing thrombus is to be avoided, the use of heparin is advisable.

When injected, heparin's *natural* action in the body is to prevent the conversion of prothrombin to thrombin (antithrombin action). By neutralizing thromboplastin, it also acts as an anti-prothrombin. Further, it inhibits the agglutination and deposition of platelets, thereby discouraging thrombus formation. Heparin acts directly on blood clotting constituents and does not destroy any component of blood or permanently change the normal constituents of blood. For emergency use it is the *only* anticoagulant which acts almost immediately (within a few minutes on intravenous injection). For safety's sake, its action can be terminated rapidly when necessary. Because of its rapid action, most authorities agree that initial control of thrombo-embolic diseases should be effected by means of heparin administration.

Significant differences exist between heparin and oral anticoagulants:

	HEPARIN	ORAL ANTICOAGULANTS
Latent Period	Immediate Effect I.V.	24-48 Hours
Effect on Prothrombin Level of Blood	Slight	Markedly Lowered
Effect on Coagulation Time of Blood	Markedly Prolonged	Slightly Prolonged
Regulation of Anticoagulant Action	Easy	Difficult
Suspension of Action	Rapid	Delayed
Duration of Anticoagulant Action	12-24 Hours	Several Days
Mode of Administration	Parenteral Only	Oral

Combined heparin-oral anticoagulant therapy overcomes one of the disadvantages of oral therapy by making available the immediate action of heparin on coagulation time during the induction period of the oral drug.

Thus the use of oral anticoagulants in hospitals complements but does not replace the use of heparin. To date, no other substance has proven as effective as heparin in the prevention and treatment of thrombosis and embolism.

Why LIQUAEMIN®?

Purified heparin was first made available to physicians and hospitals in the United States in 1939 as Liquaemin Sodium 'Organon'. Organon's experience in the manufacture of heparin thus antedates that of all other companies. Because and through this long experience in heparin manufacture, not only is Liquaemin Sodium biologically standardized, but before its release is subjected to sixteen extra safety tests, several more than required by the U.S.P., to assure maximal effectiveness and safety of the preparation. Liquaemin Sodium offers only the purest grade of heparin, and solutions of Liquaemin are water-white in appearance. Thus, just as heparin has remained the only satisfactory compound of its group, Liquaemin has remained the standard heparin preparation since its introduction.

Liquaemin Sodium can be obtained in a variety of dosage forms and strengths, from the original low concentration of 1,000 U.S.P. Units (approx. 10 mg.) per cc for continuous intravenous drip, to the 20,000 U.S.P. Units (approx. 200 mg.) per cc in gelatin, to the 20,000 U.S.P. Units (approx. 200 mg.) per cc aqueous solution for convenient intramuscular depot anticoagulant effect. With its 20,000 U.S.P. Unit per cc aqueous solution of Liquaemin, Organon pioneered the now widely accepted concept that prolonged heparin effect can be achieved by injecting intramuscularly an *aqueous* solution of high concentration-low volume heparin.

These facts—dependability, purity, potency, safety—have established Liquaemin Sodium as the heparin of choice in hospitals throughout the United States.

Liquaemin Sodium is supplied in the following strengths and package sizes:

Aqueous Solutions

1,000 U.S.P. Units per cc (approx. 10 mg.)—10-cc vials

5,000 U.S.P. Units per cc (approx. 50 mg.)—10-cc vials; 1-cc ampuls

10,000 U.S.P. Units per cc (approx. 100 mg.)—4-cc vials; 1-cc ampuls

20,000 U.S.P. Units per cc (approx. 200 mg.)—2-cc vials; 1-cc ampuls; 1-cc ampuls with disposable syringe

In Gelatin

20,000 U.S.P. Units per cc (approx. 200 mg.)—2-cc vials

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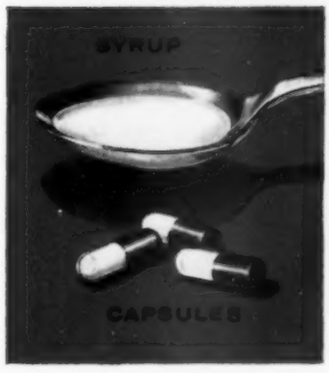
DOSAGE: Adults: CATHOMYCIN Sodium 2 capsules b.i.d. or CATHOMYCIN Calcium Syrup 4 teaspoonfuls b.i.d. Children: (up to 12 years) 2 to 8 teaspoonfuls daily in divided doses based on 10 mg. CATHOMYCIN per lb. of body weight per day.

SUPPLIED: Capsules sodium novobiocin, each containing the equivalent of 250 mg. of novobiocin—vials of 16 and 100—and as an orange-flavored syrup (aqueous suspension), in bottles of 60 cc. and 473 cc. (1 pint). Each 5 cc. CATHOMYCIN Syrup contains 125 mg. (2.5%) novobiocin, as calcium novobiocin.

*Complete bibliography available on request.



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a plan of attack

against the spread of infections in hospitals

THE WAR IS ON! Never, since the days of Lister have hospital personnel been waging such a fierce war.

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There is only one apparent effective control: *complete disinfection throughout the hospital.*

It must be continual—there must be a return to the "old fashioned" hospital attitude and methods of asepsis. No longer can we let antibiotics substitute for the tried and true methods of cleanliness.

PLAN OF ATTACK AVAILABLE. Huntington Laboratories has developed a brochure which presents an outline for over-all control of infections in hospitals. To be successful, it must be instigated by the Administrative Head of the hospital. Copies of "A Suggested Plan for Infection Control in Hospitals" are available without charge. Send for it. We think you will find it helpful.

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Getting the Pill to the Patient

A Candid Look at New Procedures for the Small Hospital Pharmacy

by Alfred A. Mannino
EXECUTIVE DIRECTOR, HOSPITAL DEPT.,
McKESSON & ROBBINS, INC.

Less than half the 7,000 hospitals in the country have accredited pharmacists on their staffs, yet more than 30% of every supply dollar goes for pharmacy purchases. Population is increasing at the rate of more than 7,000 people per day. Disposable incomes continue to spiral. These factors point to a continued expansion in hospitals and hospital services. But while hospitals are growing in number and facilities, the number of trained hospital pharmacists is not keeping pace, and today's shortage will become even more acute as time goes on.

How to provide economical care for the constantly increasing patient load and compensate for the decreasing number of professionally trained personnel, and at the same time cope efficiently with the growing complexities of modern drug buying, is one of the toughest problems facing hospital administrative staffs today.

How are hospitals meeting this challenge? In smaller hospitals, who is responsible for "getting the pill to the patient?" Sometimes it is the general purchasing agent. Often an overworked doctor or nurse —or even the administrator himself. But whoever it is, this extra responsibility is a tremendous burden, especially when you consider the some 7,000 items with which the average hospital pharmacy deals. Obviously, a knowledge of the economic factors of successful management activities, particularly astute buying and inventory procedures, is essential to his success. One serious problem confronting hospitals today is the increasing number of new and nonstandard items. New items, new sizes and duplicates have also become a costly factor. Even storage is a headache. Less than half the country's hospitals are able to handle more than a three-month inventory.

Two keys to efficient hospital pharmacy operation, then, are: standardization and scientific inventory management. But how is the already overburdened person in authority to achieve them without a trained hospital pharmacist?

The answer—and, fortunately, there is an answer—is to look to a supplier of unquestioned integrity and comprehensive services to act as a reliable pharmacy consultant. A good supplier can be counted on to screen and select only drugs and drug products produced by reputable manufacturers, thus insuring reliable merchandise and reduce the need to carry nonstandard items. He will also help maintain a stock level at which the combined costs of *procuring* supplies and *carrying* inventory are at a minimum. And there are countless other services he can offer. Thus, it is important to choose a supplier carefully, to investigate his qualifications and services thoroughly. Here is a checklist of 6 basic questions to aid in his selection:

1. **Will he give you competent professional advice that is honest and unbiased?** (Each one of McKesson's Hospital Service Departments offers the services of a responsible drug therapy consultant—"Rex" McKay®, a trained pharmacy specialist, who is ready to advise on specific problems, to speed emergency delivery service when requested and to keep you abreast of the latest drug developments.)

2. **Does he carry a complete stock of all items you might need?** (McKesson buys from every major drug manufacturer as well as manufacturing under its own label, and researches every new item on the market to determine which manufacturer makes the one best suited to hospital use. McKesson also provides warehouse facilities for bulky items for many small hospitals.)

3. **Does he have the latest information on new developments in the drug field?** (Twice a year, McKesson's Hospital Service Department men undergo intensive training to help them keep up with new products, new methods, new developments that will in turn help hospital pharmacists.)

4. **Does he buy in large quantities direct from manufacturers?** (Whenever quantity purchasing is advantageous, McKesson does so and passes the savings along.)

5. **Does your supplier have national distribution?** (McKesson & Robbins, for example, maintain 82 professionally staffed and completely stocked Hospital Service Departments throughout the country. They service well over half the country's 7,000 hospitals right now and have a total of 125 years' experience in dispensing, manufacturing and distributing drug and pharmaceutical products.)

6. **Is he nearby and readily available?** (McKesson's 82 Hospital Service Units are strategically located throughout the country. They offer a local source of supply that is available any hour of day or night for emergency deliveries as well as routine service.)

Some hospitals, of course, buy direct, but 64% find McKesson & Robbins Hospital Service Departments "just what the doctor ordered." They depend largely on McKesson for economical and efficient management of their hospital pharmacies. McKesson's Hospital Service Departments make a specialty of servicing the small hospital pharmacy and they welcome inquiries on any phase of hospital pharmacy operation. We will send you the name of the McKesson Hospital Service Department nearest you—address inquiry to A. A. Mannino, McKesson & Robbins, 155 East 44 St., New York 17, N. Y.

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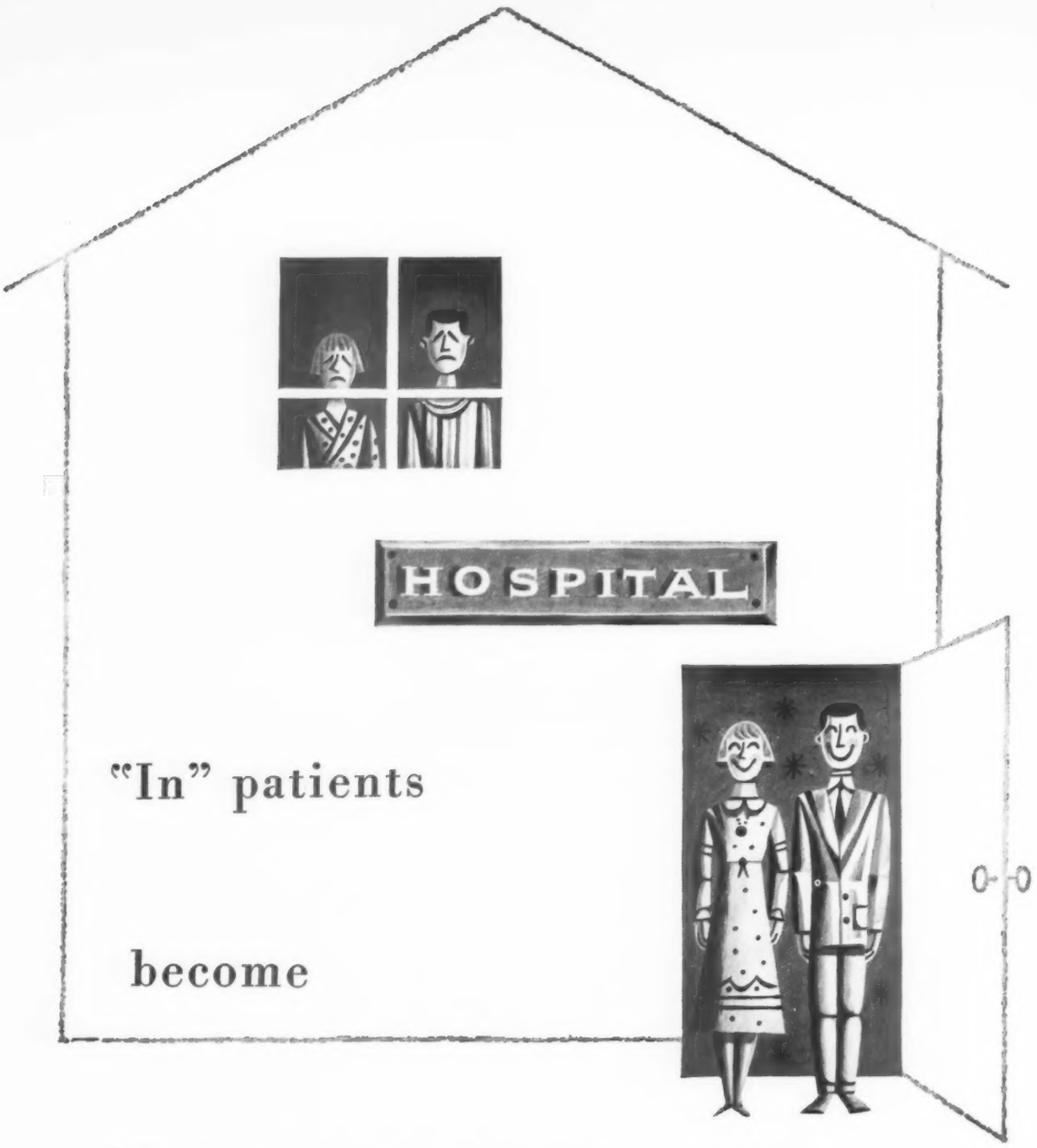

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Dear Sirs:

Journal Appreciated

DEAR SIRS: I want to say that we certainly enjoy and get a great deal of information from the AMERICAN JOURNAL OF HOSPITAL PHARMACY. I was particularly interested in the article on "A Checklist of Psychotherapeutic Drugs," by Benjamin Teplitsky which appeared in the July (1958) issue of the JOURNAL. If available, I would like to obtain reprints of the article for the pharmacists at this hospital.

Thank you for your service.

GERARD L. PIERCE, *Captain, MSC*
Chief, Pharmacy Service

Madigan Army Hospital
Tacoma, Washington

Reprints Requested

DEAR SIRS: We would like to have fifty reprints of the Report of the Committee on Disaster Preparedness which appeared in the Official Reports of the SOCIETY in the August issue of the AMERICAN JOURNAL OF HOSPITAL PHARMACY. Is it possible to get them. . .

JAMES S. PALMGREN, *Deputy Director*
for Emergency Hospitals

Evanston Civil Defense Corps
Municipal Building
Evanston, Illinois

EDITOR'S NOTE: Because of the many requests for reprints of the 1958 Report of the Committee on Disaster Preparedness, the ASHP Executive Committee is giving consideration to making reprints available. If reprints are provided, a note will be carried in THE JOURNAL.

Liked Editorial

DEAR SIRS: . . . I enjoyed the editorial on "Organizational Needs of the Society I" which appeared in the July issue of THE JOURNAL. . .

JOHN W. WEBB, *Assistant Pharmacist-in-Chief*
Massachusetts General Hospital
Boston, Massachusetts

The Law of Hospital Pharmacy

DEAR SIRS: In the July (1958) issue of the AMERICAN JOURNAL OF HOSPITAL PHARMACY, we observed an article on pages 593 and 594 entitled "The Law of Hospital Pharmacy."

This excellent article explains a point which is frequently the subject of controversy between nursing staffs and the pharmacist in hospitals. We should like to have permission to reproduce this article for use by our personnel in hospital pharmacy work. If reprints of this article are available from your office, we would appreciate your advising us how we could secure a supply.

T. E. SULLIVAN, *Director*
Division of Food and Drugs

Indiana State Board of Health
Indianapolis, Indiana

Compliments

DEAR SIRS: Congratulations for the superb way in which you have developed the AMERICAN JOURNAL OF HOSPITAL PHARMACY, and particularly for the great way in which the SOCIETY has grown . . .

I hope now that your SOCIETY will take the initiative in trying to promote closer interprofessional relations between the various health professions. You can do this at a SOCIETY level, as well as at an individual level. I think it will be to the benefit of all if there can be greater cooperation among pharmacists, dentists, physicians, nurses, veterinarians, public health workers, and medical technologists. We are all working toward the same end, and I think we should all get along better if we would pull together, than for each group to go by its separate way. The pharmacists are in a peculiarly strategic position to promote the sort of cooperation which we have in mind. I do hope that you will undertake it and put it across.

CHAUNCEY D. LEAKE, M.D.

College of Medicine
The Ohio State University
Columbus, Ohio

Author's Appreciation

DEAR SIRS: I appreciate the fine job in presenting my article on "The Role of the Pharmacist in Confederate Hospitals," in the August issue of the JOURNAL.

NORMAN H. FRANKE, Ph.D.

Alabama Polytechnic Institute
School of Pharmacy
Auburn, Alabama

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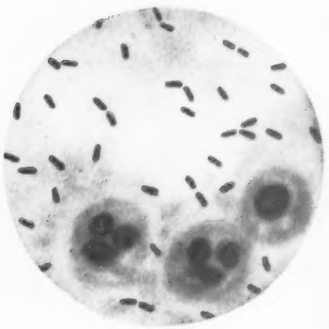

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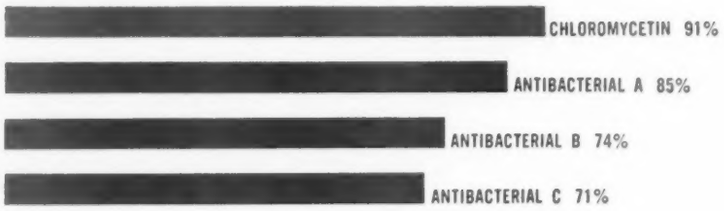

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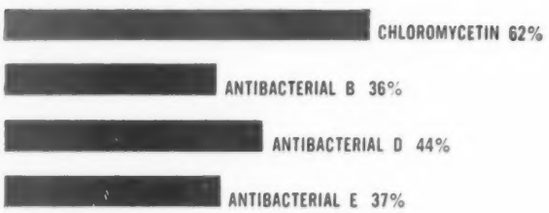
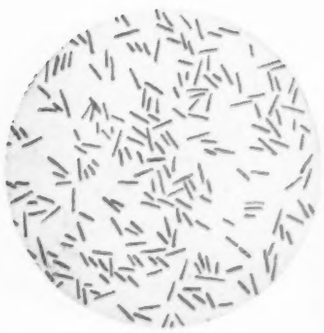
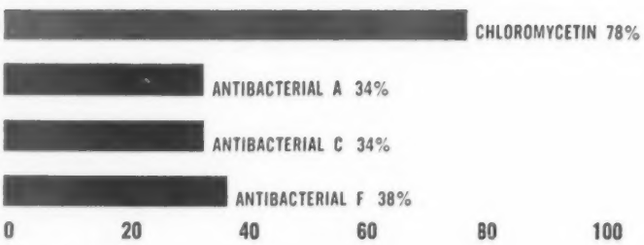




PROTEUS



*Adapted from Waisbren, B. A.: *Wisconsin M. J.* 57:89, 1958.

The antibacterial agents used in this study are those selected by the author as the ones most likely to be effective.

CHLOROMYCETIN (chloramphenicol, Parke-Davis) is available in a variety of forms, including Kapseals® of 250 mg., bottles of 16 and 100.

CHLOROMYCETIN is a potent therapeutic agent and, because certain blood dyscrasias have been associated with its administration, it should not be used indiscriminately or for minor infections. Furthermore, as with certain other drugs, adequate blood studies should be made when the patient requires prolonged or intermittent therapy.

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editorial

by DON E. FRANCKE

Organizational Needs of the Society IV: Fellow of ASHP

► THE TERM FELLOW USUALLY REFERS TO A TYPE OF MEMBERSHIP in an organization which is granted to an individual who, through advanced study or training or a series of outstanding professional accomplishments, has made himself eligible to be so designated.

The objectives of establishing the category of fellow are to encourage members of a profession (1) to prepare themselves by additional study and training to render better service to the patient, (2) to raise the standards of practice of the profession, (3) to contribute to its literature, (4) to participate in the training of future practitioners, (5) to foster investigations and research, and (6) to become the type of professional individual who reflects credit upon his profession and stimulates others to emulate his good works.

The SOCIETY is now giving consideration to the establishment of a membership category which would be termed *Fellow of the American Society of Hospital Pharmacists*. If the term fellow is to be meaningful, it will be necessary for the ASHP to establish rather rigid requirements which must be met before a hospital pharmacist may be accepted as a fellow. On the other hand, it is recognized that advanced education and training do not, in themselves, always mean that the individual possessing them is a superior practitioner—they mean only that he has greater opportunity to be. Numerous examples could be cited of practitioners whose advanced training and education have been in the schools of experience and self-study financed from tuition paid by initiative, curiosity, professional pride, a desire to give service, and an eagerness to learn. Therefore, it is believed that each active member of the SOCIETY should be eligible to apply for fellowship, the only basic requirement being that he be a licensed pharmacist. However, eligibility to make application and eligibility to be designated a fellow must be two separate and distinct entities.

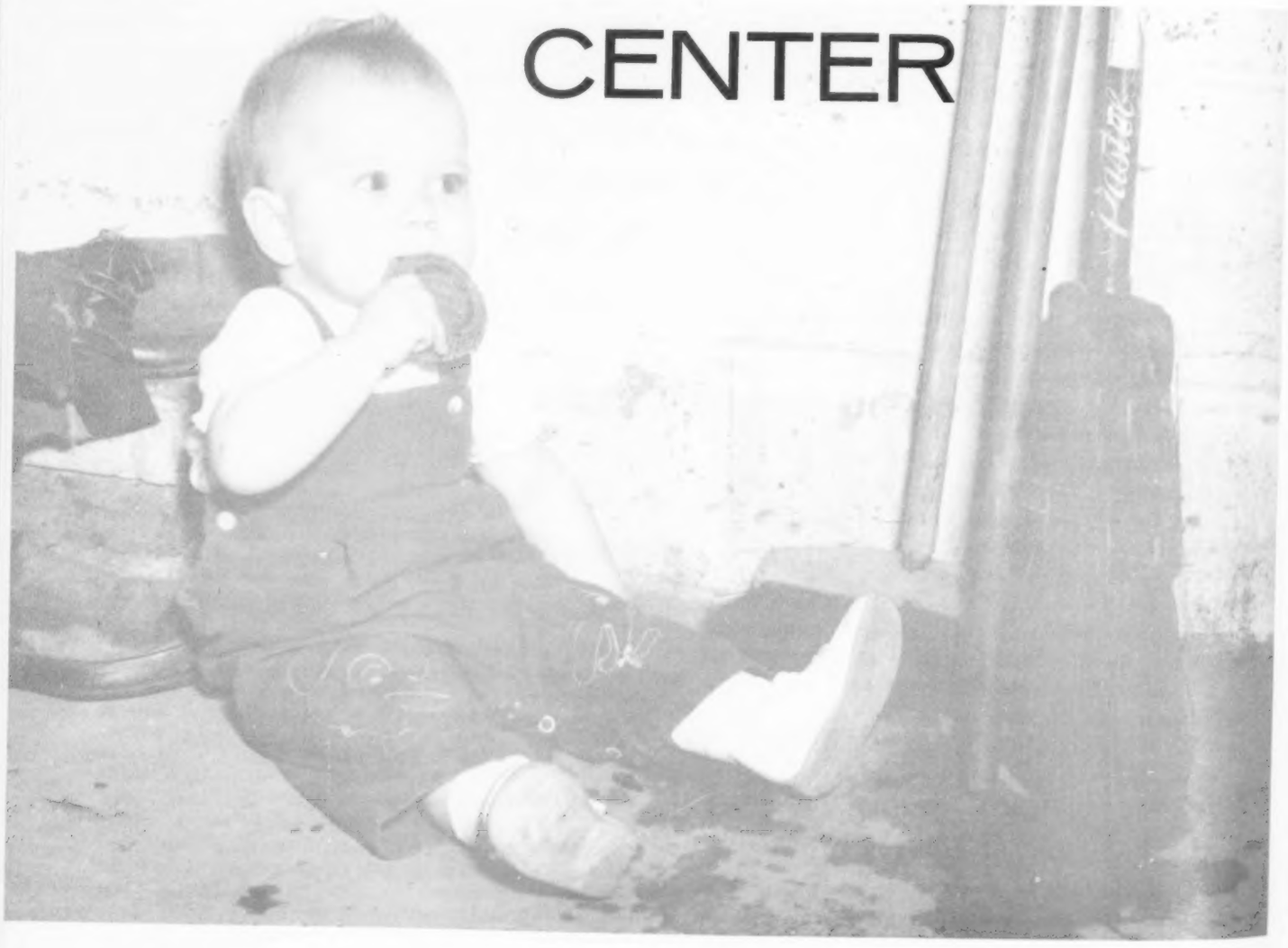
While specific requirements for fellowships in the ASHP have not yet been formulated, consideration will undoubtedly be given to several requirements along the following lines. First, the applicant for fellowship would have to show that he is operating or is employed in a pharmacy department which complies in all respects with the Minimum Standard for Pharmacies in Hospitals. This would have to be established, probably by an inspection, before any further steps toward a fellowship could be taken. Next would be submission by the candidate of evidence showing his contributions to the literature of hospital pharmacy, his attendance and participation in Institutes on Hospital Pharmacy and other refresher programs, his participation in the training of future practitioners through internship programs, his activities in local or national hospital pharmacy organizations, his investigations or research, or other special activities which demonstrate his interest in and contributions to the practice of hospital pharmacy and the advancement of his profession. Following this may be a series of oral or written examinations which the candidate would have to pass before being accepted as a fellow. Undoubtedly, the requirements would be flexible to a degree; that is if a candidate did not participate in the training of hospital pharmacy interns, other professional accomplishments could be substituted. Still, the overall requirements must be maintained at a high level if the fellowship is to be meaningful.

Some group, such as a board or committee must be established to review the qualifications of the applicant, to make inspections of pharmacy departments, and to prepare and give the examinations. It will not be an easy matter to select the members of the board of review; nor will service on the board be without its difficult moments. Board members, in fact, may anticipate a difficult and, often, a thankless job with impatient or disappointed candidates chafing because of delay or charging bias because of their failure to meet requirements. But the road to a fellowship should not be too easy to traverse and it may require some years for candidates to fulfill the requirements and be accepted as Fellows of the ASHP.

Financing such a fellowship program will be a problem. The SOCIETY will have to establish a separate, additional dues structure to carry out its fellowship program, with fees for application and examinations and with annual dues to expand the fellowship program. In fact, the costs of operating the program will be such that the SOCIETY will have to invest money in the project during the first few years and it will require several years and the annual dues from several hundred fellows before the program will be self-supporting.

The SOCIETY'S fellowship program should provide a stimulus and a challenge for hospital pharmacists to raise the standards of professional service and to make hospital pharmacy an even better specialty in which to practice.

THE ROLE OF A PHARMACIST IN THE FUNCTIONING OF A POISON INFORMATION CENTER



by ROBERT SIMONS

► WHAT ARE THE PROFESSIONAL contributions of a hospital pharmacist in the functioning of a poison information service?

What professional, public, and service groups could aid toward the planning and development of a service?

What are some sound beginning procedures?

These are some of the questions on the minds of many pharmacists. We say that we know about the need for setting up information services on poisonings. We know that the incidence of accidental poisonings is on the rise. We know that the age group most often stricken is between birth and 5 years. Yes, we read about them everywhere, in the *Saturday Evening Post, Reader's Digest, Today's Health, etc.* We know that the rapid increase in commercial products annually (some 70,000 new products plus 18,000 new cosmetics, not to mention drugs) is amazing and that each and everyone of them is a potential "poison." And we hear about Poison Centers being set up all over the country. Well, what can we do in our own community to render this important service?

This is the dilemma we were faced with in our community and we had no one place to turn for information on how to set up a service for our physicians and the public. Even in seeking ingredient and antidotal information, we were confronted with secrecy, with know-nothing replies. Well, it is our hope to aid you in avoiding these problems.

First, the need for a Poison Information Service in your community is without question. A call to your hospital emergency department or to your physician, particularly pediatrician, will justify the need.

Second, what would be a good beginning toward developing a center in your community which would provide needed information and service to physicians and public? The cooperation of representatives from several professional groups in your area is needed to start. What groups? Pediatric society, hospital association, department of health, and hospital and retail pharmaceutical associations. Just pick up your phone and call a pediatrician, a hospital administrator or his assistant, a member of the State Board of Health (perhaps he who is director of "Safety"), and another local pharmacist. Representatives of these agencies can serve as the nucleus for a planning committee, with other interested groups being added gradually. Discuss the need of a service with them and suggest having a meeting.

Where to Meet?

The best place is at a hospital. Details regarding a specific meeting room may be worked out with a representative from your hospital administration. Acquiring this meeting place in a hospital will serve as an entree to the most logical place to set up the center for poison information and to plan for incorporation of a poison treatment center within the framework of hospital emergency service. Remember, most of the accidental poisoning cases go to the hospital for treatment. Don't get discouraged if it takes more than one telephone call to arrange your first meeting, however. I know most professional men contacted on this matter are more than eager to participate. You shouldn't have any trouble here.

ROBERT SIMONS is Director of Pharmacy Service, The Memorial Hospital, Wilmington 6, Del.

How to Prepare for This First Meeting

Obtain data on poisoning incidents, both local and national, from your Safety Council or similar organization. Gather articles and clippings to present on the subject. Obtain references on how others have set up like centers throughout the country. (There are always articles in your journals that can be used.) Take with you any or all of the material accompanying this paper or that which we have available for you at the Delaware Poison Information Service (see List 1). Mainly, however, have a list of references on how to treat the various poisonings, a list of antidotes to be stocked, and a list of equipment for treatment. These three lists will go a long way in starting your committee to function.

List 1

Literature Available Upon Request

1. Antidote charts.
2. Data on death rate by location age, sex, and year.
3. Literature for distribution to parents at educational talks.
   a. "Suggestions for Preventing Accidental Poisonings"
   b. "Protect Your Family Against Poisoning"
   c. "Accidental Poisoning in the Home"
4. Literature for distribution to physicians at educational talks.
5. Representative telephone stickers for the home.
6. Representative speeches for Service Clubs, P.T.A.'s, etc.
7. A sample of log record kept at a Poison Center.
8. List of references for library, antidotes, and equipment to be stocked with check lists.
9. "Part That a Hospital Pharmacist Can Play in the Functioning of a Poison Information Service."
10. Directions for pharmacist taking telephone calls for information at the Center.
11. Suggested instructions on first aid to give someone over the phone.
12. Labels, already printed, with name of drug, dose, and use for antidotes that should be stocked in treatment rooms.

List 2
Valuable References of Poisoning Information

*1. Driesbach, R. H.: *Handbook of Poisons*, Los Altos, Calif., Lange Medical Publications, 1955.
2. Press, E.: *Accidental Poisoning in Childhood*, Evanston, Ill., American Academy of Pediatrics, 1956.
3. *Physicians' Desk Reference* (Blue Section), Oradell, N. J., Medical Economics, Inc., 1958.
4. *Suggested Antidotes* (Manual No. 101), Washington 7, D.C., American Pharmaceutical Association.
5. Osol, A. and Farrar, G. E.: *Dispensatory of the United States of America*, Philadelphia, Pa., Lippincott Co., 1955.
6. Sollmann, T.: *A Manual of Pharmacology*, Philadelphia 5, Pa., W. B. Saunders Co., 1957.
7. Martin, E. W. and Cook, E. F.: *Remington's Practice of Pharmacy*, Easton, Pa., Mack Publishing Co., 1956.
8. *Merck Index*, Rahway, N.J., Merck and Co., Inc., 1952.
9. Council on Drugs: *New and Nonofficial Drugs*, American Medical Association, Philadelphia, Pa., Lippincott Co., 1958.
10. *Poisons and Antidotes*, chart by Eli Lilly and Co., Indianapolis 6, Ind.
11. *Counterdoses for the Home*, American Druggist Magazine, New York 19, N.Y.
12. Fleming, A. J., D'Alonzo, C. A., and Zapp, J. A.: *Modern Occupational Medicine*, Philadelphia, Pa., Lea & Febiger, 1954.
13. *Facts and Comparisons*, Erwin K. Kastrup, St. Louis, Mo.
14. Howard, M. E.: *Modern Drug Encyclopedia*, New York, N.Y., Drug Publications, Inc., 1958.
15. Frear, D. E. H.: *Pesticide Handbook*, State College, Pa., College Science Publishers, 1957.
16. Spector, W. S.: *Handbook of Toxicology*, Philadelphia, Pa., W. B. Saunders Co., 1956.
17. Muenscher, W. C.: *Poisonous Plants of the United States*, New York 11, N.Y., Macmillan Co., 1951.
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19. McClutcheon, J. W.: *Synthetic Detergents Up-to-Date III 1955*, New York, N.Y., MacNair, Dorland Co.
*20. Sax, N. I.: *Dangerous Properties of Industrial Materials*, New York 22, N.Y., Reinhold Publishing Co., 1957.
*21. Gleason, M., Gosselin, R., and Hodge, H. C.: *Clinical Toxicology of Commercial Products—Acute Poisoning (Home and Farm)*, Baltimore 2, Md., Williams & Wilkins Co., 1957.
*22. Goodman, L. S. and Gilman, A.: *The Pharmacological Basis of Therapeutics*, New York, N.Y., Macmillan Co., 1955.
23. DeSanctis, A. G. and Varga, C.: *Handbook of Pediatric Medical Emergencies*, St. Louis, Mo., C. V. Mosby Co., 1956.
24. *The Pharmacopeia of the United States*, Fifteenth Edition, Easton, Pa., Mack Publishing Co., 1955.
25. *The National Formulary*, Tenth Edition, Washington 7, D.C., American Pharmaceutical Association, 1955.
26. *Trade Names Index*, American Conference of Government Industrial Hygienists, Sept. 1955.
27. *Buyers' Guide Issue, Chemical Week*, New York, N. Y., McGraw-Hill Book Co., 1957-1958.
28. Welch, H.: *The Antibiotics Manual*, Washington 6, D.C., Medical Encyclopedia, Inc., 1954-1955.
29. Booklets, Shell Chemical Corp., Agricultural Chem. Sales Division:
    A. Handbook of Methyl Parathion Formulations
    B. Handbook of Phosdrin Insecticide Formulations
    C. Handbook of Aldrin, Dieldrin and Endrin Formulations
30. *Clinical Memoranda on Economic Poisons*, Savannah, Ga., U. S. Department of Health, Education, and Welfare, Public Health Service, Communicable Disease Center, 1956.
31. Poisonous Plants of (your state), Washington, D. C., Department of Agriculture.
32. *Phosphate Ester Insecticides*, American Cyanamid Co. A compilation of articles which are reprinted from published literature.
33. *Warfarin Rodenticides*, Wisconsin Alumni Research Foundation.

DELAWARE POISON INFORMATION SERVICE

What Time to Meet

Lunch time is preferred by almost everyone. You have to eat lunch so why not meet at the same time. Social and professional interchange at this time is most conducive to producing results. Your pediatrician or yourself can arrange to have this luncheon meeting at your hospital.

What to Discuss at First Meeting

Appoint a chairman. And I suggest it be the pediatrician. Then appoint a recording secretary which I suggest be the representative of the hospital or hospitals involved. This may be an administrator or an assistant administrator. You gain excellent support by appointing these two officers as recommended because the pediatrician is mainly involved in accidental poisoning incidents since most are among children, and also you gain the support of the Pediatric Service of your hospital and community; and through effective integration of the hospital administrator on this committee you are assured of a meeting place and a center from which to operate.

Then your committee should devote some thought to a name by which its goals and objectives can be identified. Some groups prefer to use the title "Poison Control Center" or "Poison Information Center." I prefer "Poison Information Service." This title is more descriptive of a plan organized to render both information and treatment facilities within the hospital emergency service.

This is the time to discuss what information and equipment should be kept at your center. This is when you present your three important lists. The committee should review these lists and, if possible, accept them tentatively. Next, obtain financial support. The Department of Health can make an excellent contribution here by obtaining the reference books on the treatment of poisonings for your library. This is rather complete (see List 2) and costs approximately $150.00. The key books of this library are marked with an asterisk on the List 2 and we find that 90 percent of all information requested can be found in these books. Of course, as time goes on new books should be added to your library to keep it up to date.

The subject of a card file system to house product and treatment information should be discussed. It is suggested that your committee avoid the endless task of accumulating information on commercially available toxic agents. Economy of time and effort is facilitated if some existing poison information center in the country is persuaded to give or sell you a copy of its existing file. However, to find a center that actually has a worthwhile file of cards to send you is very difficult. We at the Delaware Poison Informa-

tion Service found the Florida State Poison Centers to be very cooperative and helpful. You can contact Dr. Robert Grayson of this Center and obtain a copy of over 1,000 product cards and 500 treatment cards, for a fee of $105.00. This is a reasonable charge and the purchase of such a set of cards saves months of time. It can then serve as a nucleus for your own card system. As for underwriting the cost of this, if you have established your committee as being responsible to the hospital's Emergency or Pediatric Department Committee, your hospital will more than likely undertake this worthwhile expenditure.

Where to Set up Your Service

An excellent location would be in a hospital and preferably in the hospital of your community which receives the most emergency cases. And the logical place in the hospital would be in the pharmacy or a room adjacent to it. However, it is important to have a direct line to your center with connections to the emergency room and the pharmacy of the hospital. It must be covered at all times, 24 hours a day. During their working hours, the pharmacy personnel, trained to take calls, could make referrals, if needed, or provide the information required. During evenings and nights, when a pharmacist is not available, the pediatric or medical resident of the hospital can be on call to answer inquiries. This is the reason why an extension of the direct line should be in the emergency room. The emergency room would receive the calls on off hours and the resident on call would be paged immediately. Full cooperation or awareness of the hospital's residents can be enlisted through the pediatrician serving your committee and by inviting the residents involved to become members of the committee.

List 3
Delaware Poison Information Service Log

Date_____ **Time**_____

Name_____ **Telephone No.**_____

Address _____

Age_____ **Weight**_____

Substance Taken_____ **Toxic Ingredient**_____

Amount Ingested_____ **Trade Name**_____

Time Toxic Substance Was Taken_____

Family Physician_____

Person Taking Call_____

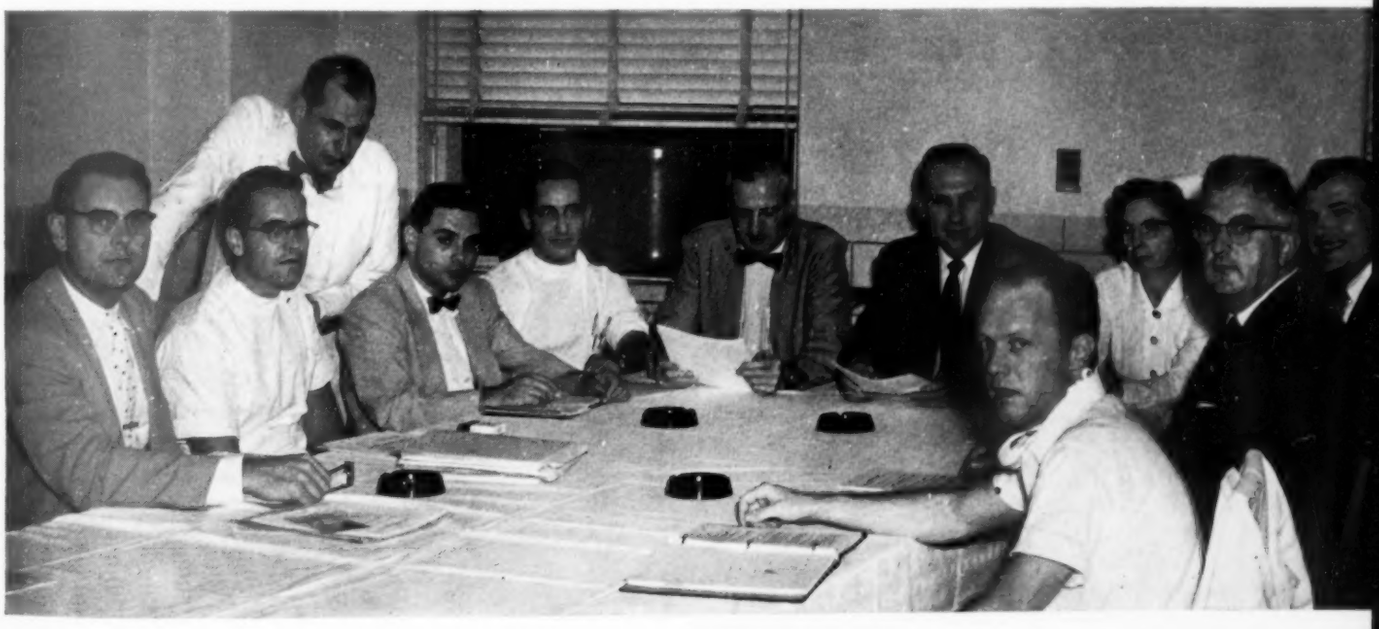
Notes: _____

_____

_____

Fellow pharmacists, this is your opportunity. Poison Centers are being set up without recognizing the professional contribution of the pharmacist. The pharmacist is an integral part of a poison information service, both to the community and the medical profession. The poison information service should be developed as an additional instrument to facilitate medical practice. Pharmacy, and the pharmacist, traditionally function to aid the physician to expedite medical practice.

A typical meeting of the Committee on which representatives of hospital administration, hospital pharmacy, the State Board of Health, pediatrics, nursing service, social service and retail pharmacy participate



Basic equipment for the service need not be expensive. A card file, a cabinet, direct line telephone, library, and a telephone request log record are the needed tools to begin service. The card file should be large enough to hold product cards as well as treatment cards. The library could consist of as few as five reference books with provision for future expansion. (See List 2.) Remember, standard pharmaceutical texts are very helpful references.

A log record is important. All incoming calls for information should be recorded. This log may be needed for statistical reports and for public and professional education programs later. Poisonings should eventually become reportable either through periodicals of your hospital association or the State Department of Public Health. The form used by our Information Service (see List 3) has worked out well for us.

However, I would like to caution you on what can and should be said to the public when they call and ask for information. Your committee should establish a policy regarding information that the pharmacist may give to a parent or the public in general (see List 4). It may be a very frightened mother at the other end of the phone. It is important not to arouse her fears but yet to obtain the necessary information so that you can answer wisely. This service should be directed mainly to the inquiring physician because it is he who will need your information most of all. However, the public may call you before a physician is contacted. Reasonable tact is important. A layman calling the center should first be calmed, questioned secondly, and then given only first aid instructions and/or directed to the nearest hospital if specific treatment is needed. This would facilitate rapid treatment and subsequent follow-up.

By now it would be time to adjourn the first meeting. A weekly meeting should be scheduled for several months to work out beginning procedures. This is important since it will reinforce the thinking of committee members and hasten establishment of your service. Frequent meetings are not an imposition, you'll find, because remember, the members have to take time out to eat lunch anyway. Also, a target date for setting up the service should be made as soon as possible.

List 4
Directions to Pharmacist Taking Telephone Calls for Emergency Poison Information

A. Calls from physicians
   1. Complete information is to be given, using pharmacological information available in the library of the Service.
   2. Remember, do not depend on memory.
   3. Check all information with current books.
   4. Fill in the Poison Information Service Log.

B. Calls from lay people
   1. Calm the person. Reassure him.
   2. Give temporary emergency information as is common in lay literature. This should never be more than immediate emergency measures, *i.e.*, in case of lye burn, flush area with dilute vinegar solution and wash with large amounts of water.
   3. Inform patient to go to nearest hospital or doctor and to take the poison container with him.
   4. Pharmacy will follow up call to physician or hospital.
   5. Give directions on how to get to nearest hospital.
   6. Remember, police will bring patient in.

DELAWARE POISON INFORMATION SERVICE

You are now on your way. What must be done at consecutive meetings to continue functioning? Well, this should come naturally but you do have the following to do. Most important is that a set of objectives of the committee be composed. It should include (1) the maintenance of the center, (2) a treatment program, (3) a publicity program, (4) an educational program for both professional and public groups, (5) a preventive program, and (6) a follow-up program.

Maintenance of the Center

By maintenance of the center I mean the actual functioning so that information can be given when needed. This function should be continuous. It will include the scheduling of personnel to man the telephone 24 hours a day, keeping the card system current, adding current editions to your reference library, and filing of articles, abstracts and other pertinent literature on poisonings.

The easiest and best way to assure 24-hour information service is to have the service set up in a hospital. The service the hospital pharmacist and residents can render here is unique. To have the pharmacy cover telephone calls by day and the medical or pediatric resident by night is ideal. However, if this procedure is not practical in your situation, a schedule, strictly adhered to, should be made up utilizing all members of your committee.

The card system employed should contain product cards and treatment cards. The need for keeping these up to date is important since it is the key to answering most of your inquiries. Product cards, containing the names of products and their ingredients, can be continually added by all members of your committee, particularly the pharmacist. Here is where the retail pharmacist can be of great service. He could call in the names of new products, the manufacturers and the ingredients, if possible, and help to keep this file up to date. If you are the only pharmacist on your committee, delegate others in the community to help you.

Drug products alone do not cover all the newly available products. This is why an industrial representative should be on your committee. He can be of great help on industrial products. We, at the Delaware Poison Information Service for instance, have representatives from both the Du Pont and Hercules companies on our committee, since both are centered in Wilmington. However, you may wait until after your

List 5
Antidotes

DRUG	USE
Acetic Acid 5% Solution (1,000 ml.)	Alkalies
Activated Charcoal—see Universal Antidote	
Adrenalin—see Epinephrine	
Aminophylline I.V. 0.25 Gm. (2 amps.)	Myocardial Stimulant
Ammonia Aromatic Spirit (180 ml.)	Formaldehyde
Amobarbital Sod. Injection 0.25 Gm. (2 amps.)	Sedative, anticonvulsant
Amphetamine Sulfate 20 mg./ml. (6 amps.)	Stimulant
Amyl Nitrite Perls 3 ml. (12)	Vasodilator and cyanide
Amytal Sodium—see Amobarbital Sodium	
Apomorphine H.T.—see Narcotic Cabinet	
Atropine Sulfate Inj. 0.4 mg./ml. (20 ml. vials)	Phosphate ester insecticides, pilocarpine, Urecholine, and acetylcholines
BAL—see Dimercaprol	
Benadryl Inj.—see Diphenhydramine	
Benzedrine Sulfate Inj.—see Amphetamine Sulfate	
Brewer's Yeast Tablets (60 W.M. bottle)	Thallium rat poisoning
Caffeine Sod. Benzoate Inj. (2 amps.)	Stimulant for barbiturates, opiates, paraldehyde, and alcohol, etc.
Calcium Edathamil—see Edathamil Calcium	
Calcium Gluconate 1 Gm. (2 amps.)	Fluorides, Black Widow spider
Calcium Lactate Solution 2% (1,000 ml.)	Fluorides, oxalates, and chlorinated hydrocarbons
CEDTA—see Edathamil Calcium	
Charcoal—see Universal Antidote	
Codeine Sulfate or Phosphate, Hypo—see Narcotic Cabinet	
Coramine—see Nikethamide	
Cottonseed Oil (180 ml.)	
Dextrose 50%, 50 ml. (2 amps.)	Cerebral edema
Dextrose 5% (1,000 ml.)	Fluid replacement
Dextrose 5% in N.S.S. (1,000 ml.)	Fluid replacement
Digitalis Injection—see Digoxin	
Digoxin Injection 0.5 mg. (2 amps.)	
Dimercaprol (BAL) 10% in oil 5 ml. (2 amps.)	Heavy metals
Diphenhydramine 10 mg./ml., 10 ml. (1 vial)	Anaphylactic reactions, bee sting
Distilled Water—see Water for Injection	
Edathamil Calcium Disodium 1 Gm. (3 amps.)	Lead poisoning
Ephedrine Sulfate Inj. 25 mg. (2 amps.)	Low blood pressure and with BAL
Epinephrine HCl 1:1,000 Inj. 1 ml. (3 amps.)	Sensitivity reactions
Ether, can (¼ lb.)	Anticonvulsant
Fluorescein Solution 1%, 15 ml. dropper bottle (1)	Eye particles
Glucose—see Dextrose	
Hykinone—see Vitamin K	
Levophed Ampuls	To support the blood pressure
Snake Antivenom	
Spider Antivenom	
Lime Water (1,000 ml.)	Oxalates, or same as Calcium

DRUG	USE
Luminal—see Phenobarbital Sodium	
Magnesium Oxide Solution 2.5% (1,000 ml.)	Acetic substances
Menadione—see Vitamin K	
Mephyton—see Vitamin K$_1$	
Methylene Blue Inj. 1%, 10 ml. (2 amps.)	Cyanides, nitrites, nitrates, or aniline dyes
Metrazol Inj. 100 mg. (2 amps.)	C.N.S. stimulant
Milk, Evaporated (2 cans)	Copper sulfate, croton oil, thioglycolic acid
Morphine Sulfate Hypo—see Narcotic Cabinet	
Neostigmine 1:2,000 (3 amps.)	
Nikethamide Inj. 25%, 1.5 ml. (2 amps.)	Cholinesterase inactivator and C.N.S. stimulant
Olive Oil (180 ml.)	
Paregoric—see Tincture Opium Camphorated	
Pentamethylenetetrazol—see Metrazol	
Phenobarbital Sod. Inj. 120 mg. (3 amps.)	Sedative and anticonvulsant
Picrotoxin Inj. 3 mg./ml. (6 amps.)	Barbiturates
Pilocarpine	Atropine and related alkaloids
Potassium Permanganate Solution 1:10,000 (1,000 ml.)	Strychnine, physostigmine, nicotine, quinamine
Procainamide Inj. 100 mg./ml., 10 ml. (1 vial)	
Prostigmin—see Neostigmine	
Quinidine Sulfate Inj. 0.2 Gm. amps.	Certain cardiac arrhythmias
Sodium Bicarbonate Powder 250 Gm.	Shock mixture
Sodium Bicarbonate Solution 5% (1,000 ml.)	Ferrous sulfate, as lavage
Sodium Chloride Powder 250 Gm.	Shock mixture
Sodium Nitrite Tablets 60 mg. (15 ml. W.M. bottle)	
Sodium Thiosulfate Inj. 0.5 Gm. (3 amps.)	Cyanide
Sodium Thiosulfate Solution 1% (1,000 ml.)	Cyanides, nitrites
Starch Solution 8% (1,000 ml.)	Iodine
Tannic Acid—see Universal Antidote	
Tincture of Opium Camphorated (180 ml.)	
Universal Antidote	Anything
Vegetable Oil—see Cottonseed or Olive Oil	
Versenate—see Edathamil Calcium Disodium	
Vinegar—see Acetic Acid 5%	
Vitamin K Inj. 72 mg. (3 amps.)	Dicoumarin derivatives
Vitamin K_1 Inj. 50 mg./ml. (3 amps.)	Hemorrhage
Water for Injection 30 ml. (3 vials)	Diluent for injections
Yeast—see Brewer's Yeast	

Shock Mixture:			Directions:
Sodium Chloride	5 Gm.		Have patient drink as much as possible without forcing
Sodium Bicarbonate	2.5 Gm.		
Water, to make	1,000 ml.		
Universal Antidote:		Use:	Directions:
Charcoal	2 parts	Against acids, alkaloids, glycosides, and heavy metals.	2 oz. in ½ glass of warm water. Follow by lavage or emetic except if poison is corrosive.
Tannic Acid	1 part		
Magnesium Oxide	1 part		

Cyanide Kits (Lilly)

DELAWARE POISON INFORMATION SERVICE

initial planning meetings to add the industrial member of your committee.

Treatment cards, the other half of your card system, should be maintained by your physicians. The pediatricians, the medical and pediatric residents of the hospital, and your consulting toxicologist should form a subcommittee to agree on treatment as indicated. Their recommendations should be added to the treatment cards. Once initial treatment cards are set up, new treatment cards can be added as they come into the product file. Treatment cards should be arranged alphabetically according to the names of ingredients. Thus you would find the treatment card for any product under its main ingredient. Also, you must not forget that clerical help is needed to maintain this card system. Here, the representative of hospital administration can be of help, perhaps by effectively using volunteers. Loss and misplacing of cards from files can be prevented by using a file drawer containing a rod in the bottom which goes through holes in the bottom of each card.

The reference library pertaining to product identification and treatment can be started with a few valuable volumes. Suggestions concerning new books should not be overlooked and the opportunity for all members to review them should be provided. Recommendations can then be screened by the subcommittee on Kardex. Your State Board of Health member can be of great help in this respect.

Careful filing of recent papers, articles, abstracts, etc., or their references on the subject is important also. They often come in handy for educational purposes, for helping in revisions of the card system, or for compiling material for preventive programs. All members should aid in maintaining the file. Bringing these files to meetings serves to acquaint members with their contents and increases enthusiasm.

List 6

Suggested Emergency Room Equipment

EQUIPMENT	NUMBER ADVISED	NUMBER ON HAND
Stomach tube, 12 sizes	1 each	------
Levine tube, numbers 10, 12, 14	1 each	------
Catheter, sterile, numbers 8, 10, 12, 20	1 each	------
Polyethylene tubing, numbers 18, 19	6 ft. each	------
Tongue holder, padded	1	------
Syringes, sterile, 2 ml., 10 ml., 50 ml.	3 each	------
Hypodermic needles, gauges 20, 24, 25	5 each	------
Intravenous administration set, sterile	2	------
Spinal puncture set, sterile	1	------
Stethoscope	1	------
Percussion hammer	1	------
Sphygmomanometer	1	------
Clinical therometers, rectal	2	------
Swabs, sterile	10	------
Dressings, sterile, 2"x2", 4"x4"	1 can each	------
Adhesive tape, ½", 1", 2"	1 roll each	------
Flashlight	1	------
Gloves, sterile	3 pair	------
Oxygen tank, small, with bag and masks infant, child, and adult sizes	1 each	------
Pharyngeal airways, sizes 0, 1, 2, 3	1 each	------
Suction apparatus, electric	1	------
Glass jars, 500 ml., screw cap	3	------
Test tubes, sterile, with and without oxalate	5 each	------
Laryngoscope, infant, child and adult blades	1 each	------
Tracheotomy set, sterile	1	------
Endotracheal tubes, sizes 0,1,2,3,4, 5,6,7,	1 each	------
Funnel	1	------
Sheet and Safety pins	6	------
Tourniquets, infant, child, and adult	1 each	------
Cut down tray with suitable I.V. catheters	1	------
Airways, infant and adult	2 each	------

Adapted from Procedure Manual of Delaware Poison Information Service by the Philadelphia Hospital Pharmacists' Association.

The Treatment Program

This program initially includes the setting up of one treatment room for cases involving accidental poisoning. It need not necessarily be at the same place that your service is set up. However, if your center is working out of a hospital, that hospital's emergency department should be set up completely for treatment and should be used as a model for other hospitals in your area.

Necessary antidotes and equipment for treating cases involving poisoning are essential (see Lists 5 and 6). The pharmacist is the logical one to suggest which antidotes should be stocked while the pediatric resident, pediatrician, or toxicologist on the committee should select the necessary equipment. However, the latter members should also have the final decision regarding the suggested antidote list. Responsibility for obtaining, labeling, and storing the antidotes should be assigned to the pharmacist. A cabinet for central storage, containing needed equipment and antidotes, can easily be made by the maintenance department or may be obtained through a neighborhood pharmacist. As you know, the American College of Apothecaries has designed a cabinet for this purpose. Here is where the retail pharmacist of your committee can be of assistance and, at the same time, get some publicity in the local papers for the Poison Information Service as well as for himself.

After setting up the model treatment room, lists of all antidotes and equipment at the center should be distributed to all hospitals in your area. It is important that all hospitals be used for treatment, and not only your center. If other hospitals are set up to treat poisoning cases, then a frantic person calling your service could be told which hospital is closest for him to go to. This would save precious time.

Packaged "Universal Antidote" could be prepared by the pharmacists and distributed to physicians as another service. Thus, it should never happen that a physician at a hospital emergency ward would not have an antidote or a specific apparatus available at the time of need. I am sure this happens in many hospitals. To see that this cannot happen in your hospital is your obligation.

Exhibit illustrating cooperation among representatives of the various health groups as set up by the Delaware Poison Information Service

The Publicity Program

A subcommittee for the development of appropriate publicity would be desirable. Its representation should include the local medical society, State Board of Health, both hospital and retail pharmacy, and hospital administration. The Poison Information Service should be utilized as an instrument of public education. It is suggested that the physicians in your community be informed of the service first, since it is essentially a physicians' service.

Several suggested methods of publicizing the service to physicians could be: Utilizing monthly morbidity reports or other departmental periodicals from your State Board of Health; announcements of the service at various staff and professional meetings of physicians; an article prepared by members of your cammittee explaining the service's functions for the local medical journal; and an exhibit depicting the service which could be displayed at local conventions or seminars.

Press releases and radio spot announcements are excellent ways to inform the public. The telephone number of your service could be placed in your local telephone directory under "Emergency Calls" and under "Poisons" in the classified pages. Your local telephone company would gladly print telephone stickers to be distributed to the public and the professions as a public service. Service clubs in your area

List 7
Suggested Instructions to Persons Seeking First Aid Information in a Poison Ingestion Case

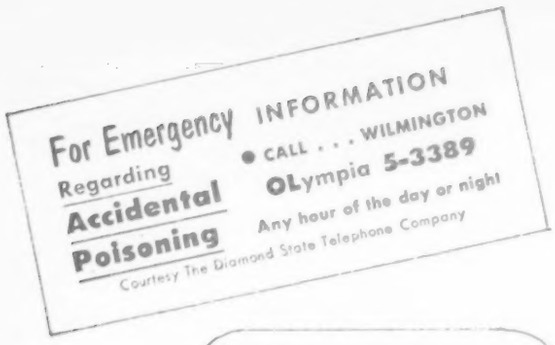
The steps have been listed in the approximate order in which they should be carried out:

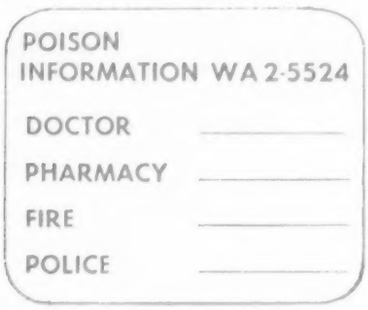
1. **Have the child drink as much as possible of one of the following:**
   Water; water to which one teaspoon of mustard or 3 teaspoons of salt have been added per cup; water to which raw egg white has been added; or milk.
2. **Turn the child over the knees in a spanking position, face down, with the head lowered as far as possible. Support the head with one hand and induce vomiting by pressure on the back of the tongue with the finger (nail cut short) or the blunt end of a spoon or knife if the child attempts to bite.**
3. **Wash away any material which has been spilled on the skin with copious amounts of water.**
4. **If by chance Universal Antidote is available, this should then be given in a suitable liquid prior to starting for the hospital.**
5. **If transportation is available come to the hospital at once. Do not spend more than five minutes trying to accomplish the above procedures.**
6. **Bring the container from which the substance was ingested to the hospital and save any vomitus for later analysis. Do not waste time hunting the container if the substance taken was unknown. Do not give the patient any olive oil, vegetable oil, or sodium bicarbonate.**
7. **If no transportation is available, keep the patient in the prone position if he is unconscious or vomiting. Find someone to give artificial respiration if the patient is not breathing. Protect the patient from injury if he is having convulsions and be careful not to stimulate in any manner.**

Contraindications to induction of vomiting would include the following:

An unconscious or stuporous patient who might aspirate; in cases of lye ingestion some people feel vomiting should be induced if the patient is detected within the first 30 minutes, but *never* after this. In cases of kerosene ingestion, unless you are quite certain that a very large amount has been taken and that there will be considerable delay in getting to a hospital, vomiting should be avoided.

Delaware Poison Information Service





List 8
Suggestions For Preventing Accidental Poisonings

A. Prevent Hazards in Home

1. Keep all drugs in a medicine cabinet out of reach of children. If it is possible for children to climb up to the medicine cabinet, then a lock should be put on it and the key stored in a convenient place. I would even recommend getting down on your hands and knees to simulate a child.
2. Discard all old prescriptions and those of unknown character. Never keep an old prescription just because you did not take all the doctor prescribed. Many drugs lose their strength and potency with age and sometimes become very toxic and irritating. Your next sickness that you attempt to treat may require something entirely different.
3. Read all labels carefully before using and follow directions for their use.
4. Read and seriously observe the caution statements that are often found on packages.
5. Always keep items in their original package. Never store such items as paint thinner or kerosene in beverage bottles or other types of food containers.
6. Store all agents of a dangerous nature apart from ordinary medicinal agents, to avoid confusion when taking medicine in haste.

B. Educate Yourself and Children on These Dangers by:

1. Attending meetings or talks such as this on poisonings.
2. Telling your neighbor about these hazards.
3. Constantly instructing your children about the dangers of eating pills, leaves, roots, barks, etc.

C. Post your Poison Center's phone number on your phone together with your doctor's phone number.

YOUR POISON INFORMATION SERVICE

may contribute to your effort by printing them as a civic project. These stickers could be distributed by local retail pharmacists, by members of your committee, and by speakers provided at educational programs presented to the public.

Newspaper reports concerning current poisoning incidents would tend to keep the value of the service current and reinforce its educational potentials.

A speaker's bureau to present the problem of accidental poisoning to the public would be an excellent approach to community education. Any member of your committee could be on it. You would find it both interesting and educational to yourself if you

List 9
Steps To Take If Poisoning Occurs

1. The first thing to do is to identify the poison so that specific measures may be promptly instituted. But do not waste time making an extensive search for it.
2. Call your physician or Poison Control Center at once or if he cannot be reached rush the child to the hospital where they are prepared for such emergencies. It is especially important to take the container to the hospital or the doctor's office so that the nature of the poison can be established and the specific treatment can be administered. If a doctor cannot be located or if you are too far from a hospital, then your knowledge of first aid becomes extremely valuable.
3. Remove the bulk of the poison from the stomach by an emetic, which is a substance that will produce vomiting. Common household emetics are: One tablespoonful of powdered mustard in a glass of warm water, or two tablespoonsful of table salt in a glass of warm water, or tickling the back of the throat with finger while patient is lying over your knees in a spanking position. This will produce vomiting shortly and will remove the bulk of the poison from the stomach. Save vomited material for examination. There are two very important exceptions to remember before giving an emetic—never give an emetic after swallowing corrosive poisons such as lye, kerosene or strong acids because it will further damage the already damaged tissue from the throat to the stomach—and never give an emetic to an unconscious or semi-conscious patient.
4. Administer an antidote for the residual poison not removed from the stomach by the emetic if the antidote is known. This can usually be found on the label of the container of many toxic agents like the insecticides. But unfortunately all preparations do not have it. Never assume a preparation safe just because it has no warning or caution on the label.
5. Whenever the nature of the poison is unknown one may safely give what we call the Universal Antidote. The universal antidote consists of three ingredients: (a) pulverized charcoal, two parts, a substance which will absorb many poisons, (b) magnesium oxide, one part, which is an alkaline substance to neutralize any acids present, (c) tannic acid, one part, a substance which will precipitate many alkaloids such as strychnine, nicotine, and codeine and many metals of mercury, lead, and aluminum. For those in the home that may not have these specific chemicals to use for the Universal antidote they can use burnt toast for charcoal, milk of magnesia for the acid neutralizer, magnesium oxide and strong tea to give the tannic acid. This also deserves a word of *caution* because of the fact that a universal antidote to take care of any unknown substance or agent is just a philosopher's dream. This antidote will help in the case of many agents, but with the rapidly growing list of medications and chemicals there are many which this universal antidote will not help at all. So *always* after giving any form of emergency first aid, seek the advice of a physician and prevent a false sense of security leading to tragedy.

YOUR POISON INFORMATION SERVICE

would be the speaker.*

The publicity program should be a continuous function and can be broadened. Your local hospital pharmacists' association would be an excellent group to develop a speaker's bureau. The Philadelphia Hospital Pharmacists' Association, for instance, is now engaged in this service.

Other pharmaceutical organizations and the nursing association should also be included as both recipients of such educational endeavors and as additional professional resource groups. An article prepared for local and national pharmaceutical and nursing publications would be a worthwhile undertaking.

The Educational Program

The educational program, in certain respects, will go hand in hand with your publicity program. Again, this program can be divided into professional and public phases. The medical profession would be interested in case history data, statistical data, and treatment instruction regarding poisonings. Case data would pertain to odd incidents and their outcome, or perhaps information on new products that may be reasonable or unique in your area, or perhaps reports you receive from the National Clearing House. Statistics from your center can be sent to all physicians. These statistics can be compiled from the log kept at your center and other data received from cooperating hospital emergency rooms. Your member from the Department of Health or Safety Council can help you to gather, process, and distribute these. Newer treatments or antidotes for potential poisons should also be given to physicians in your area. Treatments and their outcome should be discussed in conferences and staff meetings by the pediatric resident of your committee as an inservice educational program. This information could be sent also to physicians by way of monthly letter or enclosure sent by the hospitals, medical association, or Department of Health.

An educational program may also be directed to local retail and hospital pharmacists. I would suggest forming a Poison Control Committee, if you don't already have one, for your local hospital and retail pharmacists' associations. Through these committees you can educate pharmacists on poisoning by distributing to them the same informative data and statistics that your service sends to physicians. You can distribute literature to the retail stores and hospitals for them to hand out to the public, or for use

*A sample copy of a representative talk to be given before local groups may be obtained from the author.

The author wishes to express appreciation to the members of The Delaware Poison Information Service, and especially to Dr. Mark Kenyon of The Delaware State Board of Health, for the valuable assistance in the preparation of this article.

POTASSIUM PERMANGANATE

STERILE SOLUTION

ACTION—An oxidizing agent. It neutralizes organic substances such as strychnine, nicotine, physostigmine and quinine. Solution **must** be completely dissolved and **filtered** or it is caustic in itself; it is best to use a predissolved solution in about 10% concentration and add 10 ml. of this to a 1,000 ml. of water for lavage.

METHYLENE BLUE

USE—Produces methemoglobin, is used in cyanide poisoning. Amyl and sodium nitrite are better agents; also reduces methemoglobin to normal. May be used in methemoglobinemia due to nitrites, nitrates and aniline dyes.

ADMINISTRATION—1 mg./lb. of weight as a 1% solution by I.V. injection. Take at least 5 minutes. Avoid infiltration which causes tissue necrosis. Repeat in ½ hr. if necessary. Also use ascorbic acid 100 to 200 mg./24 hrs. to enhance its action.

VITAMIN C

USE—Strong reducing agent; aids in cyanide excretion; converts methemoglobin back to hemoglobin after methylene blue injection. May be used as accessory measure to speed the metabolism in amphetamine, Benzedrine, Desoxyn and Norodine, nicotine, and benzene poisoning.

AMYL NITRITE "PEARLS"

USE—Cyanide Poisoning.

ADMINISTRATION—Give inhalations for 30 seconds of each 2 minutes until Sodium Nitrite is available for I.V. use. Then give 0.3-0.5 Gm. of sodium nitrite dissolved in 10 to 15 ml. of water, followed by (not simultaneous with) slow I.V. of 12.5 Gm. of sodium thiosulfate in 50 ml. of water over a 10 minute period. (Methylene blue is not as good as this program.)

CALCIUM EDATHAMIL

(VERSENATE)

USE—Heavy metal poisoning, especially calcium oxalate, barium sulfate, and lead phosphate.

SINGLE DOSE—0.5 Gm. per 30 lbs. as a 3% solution given intravenously in a 1 to 2 hour period, also I.M.

by the pharmacists in discussing poisonings with physicians. You can be of great service to your colleagues by showing them how your information can be used as a public relations program for them.

The nursing profession should not be forgotten. An educational program directed to the nurse in training is needed. Lectures or discussions on accidental poisonings should be included for nursing groups, professional and pre-professional, as well as staff nurses in hospitals. And remember, the visiting nurses are essential in the follow-up of the patient after treatment.

The Preventive Program

Three major areas of concern are the home, the patient, and the poison—or epidemiologically, the environment, the host, and the agent. Education in all of these areas is vital. Ignorance and carelessness on the part of parents in handling and storing medication and potentially dangerous household items should be stressed. Usually, it is a child who is the host, so remember he is an experimenter, and imitator, an investigator and a "vacuum cleaner" all rolled into one. Attractiveness and availability of the specific agent are important in making the potential agent more dangerous.

Physicians and pharmacists confer regarding information on poison control. Pharmacist Robert Simons is shown at far left and Pharmacist Robert Cathcart is seated at desk

Your speaker's bureau will be a valuable asset in this program since it will contact service clubs, parent-teachers associations, and other groups who are interested in poison control or whose interest can be stimulated. Brochures and literature distributed at meetings will serve to make persons aware of potential home poisoning hazards.

Literature available for distribution includes: "Suggestions for Preventing Accidental Poisonings," "Steps to Take If Poisoning Occurs," "Antidotal Charts," and others (see List 1). Literature distributed to the public at retail pharmacies or physicians' offices is important. Also charts on first aid for poisoning can be given to your local Red Cross first aid instructors for distribution. Perhaps your hospital has a Home Care Program in which poisoning prevention could be emphasized.

Follow-Up of Treatment Program

The follow-up should serve to shed light on the existence of other health problems in a family group.

In addition to gathering epidemiological data regarding causes and other factors of a poison case, procedures for follow-up should be worked out in consultation with hospital administration, the Visiting Nurse Association, the public health nurse, and the hospital's Social Service Department. A good working arrangement in any specific area should be adopted to meet local needs. Your hospital administrator would be a key person in this area. An advisory committee made up of members of participating organizations for follow-up of poison cases would be an effective way to approach this area.

Summary

I have tried here to raise your enthusiasm in serving your community by setting forth a plan for you to follow in the functioning of a Poison Information Service. I have tried to answer your question as to what a pharmacist can do toward rendering such a service. I have given you the roles that other members of a Poison Information Service Committee should perform, and have taken you through the setting up and functioning of a community committee step by step, with emphasis on the role of the pharmacist.

The American Academy of Pediatrics, the State Boards of Health, the Municipal Safety Committees, and various other groups have long set the pace for setting up so called "Poison Centers" in our country, but where is hospital pharmacy? Hospital pharmacy is ideally situated to perform a great public service by helping to organize and manage Poison Information Services. It is an opportunity for those who wish to give a much needed service to the community and to the public.

PLASTICS

and the U.S.P. requirements for

TIGHT,

LIGHT-RESISTANT

CONTAINERS

by GEORGE F. ARCHAMBAULT, PH.C., LL.B., D.SC.

► AT THE TWELFTH ANNUAL MEETING OF THE AMERICAN SOCIETY OF HOSPITAL PHARMACISTS held in 1955, the following recommendation was passed:

Standard Containers

Whereas the U.S.P. and the N.F. direct that many of the official preparations be packaged, stored and preserved in air-tight, light-resistant containers, and

Whereas studies indicate that these many times have long "shelf life" when prepackaged in hospitals, and

Whereas adequate protection should be provided to maintain full therapeutic effectiveness,

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Presented at the Annual Meeting of the AMERICAN SOCIETY OF HOSPITAL PHARMACISTS in Los Angeles, Calif., April 1958.

Be it resolved that the SOCIETY go on record as condeming the practice of using paper boxes, envelopes and ointment tins as medication containers, and

Be it further resolved that the SOCIETY recommend that the standard containers meet the air-tight, light-resistant requirements of the U.S.P. and N.F.

The U.S.P.H.S. and Light-Resistant Medication Containers

In 1949, six years prior to this resolution, the Division of Hospitals of the U.S. Public Health Service took a similar stand—the Pharmacy Branch of the Division of Hospitals of the Public Health Service summed up its philosophy on this subject at that time as follows:

"As long as the *U.S.P.* and *N.F.* find the need for requiring certain standards for the containers of certain items of pharmaceutical manufacturers and packages, similar standards should prevail

for containers of such items through to the ultimate consumer. Further, to avoid costly duplication of inventories in this area, the Division of Hospitals adopted these tight light-resistant containers as standard medication containers for Public Health Service Hospitals."

The Pharmacy Branch of the Public Health Service, Division of Hospitals, stated at that time, that it believed it had a definite responsibility to see that prescribed medications were dispensed in such a manner that preparations would not deteriorate for as long a period as possible, and not necessarily for only as long a period for which the prescription was intended, if consumed according to instructions.

Further, it was pointed out that Public Health Service pharmacists have, in many instances, as part and parcel of their ordinary duties, the prepackaging of medications into individual patient prescription sizes; therefore, they have the additional responsibility, not unlike the manufacturers, for the continuing stability of the products packaged.

The Division of Hospitals in establishing its standards for prescription containers felt that it could, in justice to its patients, do no less than to subscribe to the standards laid down by the *U.S.P.* and *N.F.* for packaging, storage, and preservation of labile items; standards which guarantee a basically sound prescription container service inasmuch as it meets all dispensing needs, prevents duplication of prescription container inventory, and remains in the competitive glass prescription container service field.

Industry and Light-Resistant Containers

An interesting industry slant on the importance of light-resistant containers appeared in the *Modern Packaging Encyclopedia,* 1952, page 152:

"One dairy, at least, is trying amber for premium grade milk to provide extra flavor protection by *screening out undesirable light rays.*"

The *Milwaukee Journal* of October 25, 1951, on page 3, carried a Borden Milk advertisement which read:

"New, light-resistant *amber*-color containers to protect the precious vitamins, to preserve the delicate, delicious flavor of Gail Borden Milk."

Plastics and Light-Resistant Containers

Today, 1958, the era of plastics is well upon us. Hospital pharmacists are inquiring, because of the availability of plastic prescription containers, as to the U. S. P. and N.F. standards for "well closed," "tight," and "light-resistant" containers in relationship to these plastic containers. Do plastic containers meet these standards is their query.

This paper is the result of a recent study of the literature on the subject. Its purpose is to provide the busy hospital pharmacist with a summary of available information on this subject, information selected because of its interest to hospital pharmacists who concern themselves with good pharmaceutical practice in the dispensing of medications.

In summary, it was found that plastic containers can meet and exceed the U.S.P. requirements for "light-resistant containers." Not all amber or white plastic containers meet the U.S.P. standard but some do. This matter is best handled by including this requirement in the specifications when ordering, requiring that the container meet the U.S.P. requirements for light-resistant containers.

Moisture Vapor Transmission

Also, it was found that certain plastic containers meet the definition of well-closed containers as far as the closure and its lining are concerned.

On one point, there appears to be some difference of opinion. Some of the more rigid testers of plastic containers are of the opinion that the containers themselves do not measure up to the *moisture vapor transmission* requirement expected of well-closed glass containers fitted with well-lined and otherwise commercially accepted closures.

These individuals proved to their satisfaction that moisture vapor was transmitted through the walls of a perfectly sealed polystyrene container. However, these MVT tests resulted from trials that approximated an exposure equivalent of two years of shelf life.

On the other hand, less stringent but still practical tests have indicated that the MVT characteristics of certain plastic containers and their closures, including polystyrene, exceed other plastic and even poorly closed glass containers.

Polystyrene and vinylidene show the lowest moisture absorption of all the plastics; the cellulose acetates behave poorly in this characteristic according to Sasso and Brown.

Polyethylene and Styrene Containers

Miscellaneous comments noted in the literature on polyethylene or styrene containers of interest to hospital pharmacists are as follows:

1. Essential oils and certain other materials migrate rapidly through the walls of polyethylene containers.
2. Medium and high density polyethylenes provide more protection against such migration than the low density polyethylenes.
3. Polyethylene is the most common plastic used in plastic medication containers. Its lightness in weight, unbreakability, and dent-proofness are its key advantages over other substances.
4. Savings in transportation charges and handling are to be considered in the use of this form of container. Polyethylene containers weigh approximately one-third of comparable glass containers but cost twice

as much to ship by weight under freight tariff regulations of the Interstate Commerce Commission. Glass has a class rate such as coal.

5. Colors are available in the modern plastic container.

6. As mentioned previously, permeability is a possible draw-back to the use of plastics containers. The effect of permeation (a characteristic of substances to allow the passage of fluids) shows in the development of a bad odor, change in taste, rancidity, discoloration, loss of volume, etc. Manufacturers are lining plastic containers with special plastic linings such as polyvinyl alcohol to overcome this problem in the packaging of oils, and certain oil formulations.

7. Some authorities believe that medium density resins will correct the permeability problem in most instances and that the costly high density resins are not necessary for this purpose.

Sterilization of Plastic Containers

High density resins may be heat sterilized; the ordinary density polyethylene containers may not be heat sterilized. High density polyethylene such as "Marlex 50" has a heat distortion temperature of about 170°F. at 66 PSI, and a softening temperature around 260°F. and therefore, is quite capable of steam sterilization at 15 lbs. pressure. Where boiling satisfies sterilization needs, the medium density resin container will suffice.

"Cold sterilization" techniques using certain gases, alcohol, sodium hypochlorite, and other chemical solutions are possible with the polyethylene container.

It is interesting to note that the Davol Rubber Company of Providence, Rhode Island, has recently placed on the market its plastic nursing bottle, one that can be sterilized by steam pressure or boiling up to 250°F., making the bottle hospital-accepted. The plastic material is break-proof and will not warp or distort. Because of its smooth, hard surface, washing inside and out is easily effected. The manufacturer also claims that the container will neither discolor nor absorb odors.

Closures for Plastic Containers

No discussion of plastic containers or container standards would be complete without a comment or two on closures. It appears quite evident that plastic phenolic compounds are in a dominating position as a closure substance. Urea formaldehyde is used considerably as a bottle closure material for cosmetics and medicines where white or pastel colors are sought. The higher cost of urea formaldehyde has until recent years, restricted its use generally as a closure substance. Styrene closures appear to be ideal for acids.

A definition of plastics as stated by Crandell might be a good closing item for this short summary:

"Any one of a large and varied group of materials which consists of, or contains as an essential ingredient, an organic substance of large molecular weight and which while solid in the finished state, at some stage in its manufacture has been or can be formed into various shapes by flow, usually through application singly or together of heat and pressure. Admittedly this is truly an earful, but there is no escape from it. Plastics are highly complex chemical compounds."

Crandell refers here no doubt to Styrene and polyethylene type plastics. The phenolic and urea type plastics are not processed by flow techniques but rather by compression processes.

Summary

This is far from a scientific study. It is not intended as such. The sole purpose of the paper is to pinpoint the highlights on plastic containers for hospital pharmacists who have a curiosity in this direction. The author sought to determine the status of plastics in connection with the U.S.P. and N.F. standards for containers. It appears that plastic containers can and do meet the U.S.P. and N.F. requirements for light-resistant, well-closed containers. These do not include all plastic containers, but only those whose manufacturers use these U.S.P. and N.F. or higher standards for their manufacturing goals. To insure receipt of such containers, it is recommended that specifications attached to orders read "to meet the U.S.P. and N.F. standards for tight light-resistant containers."

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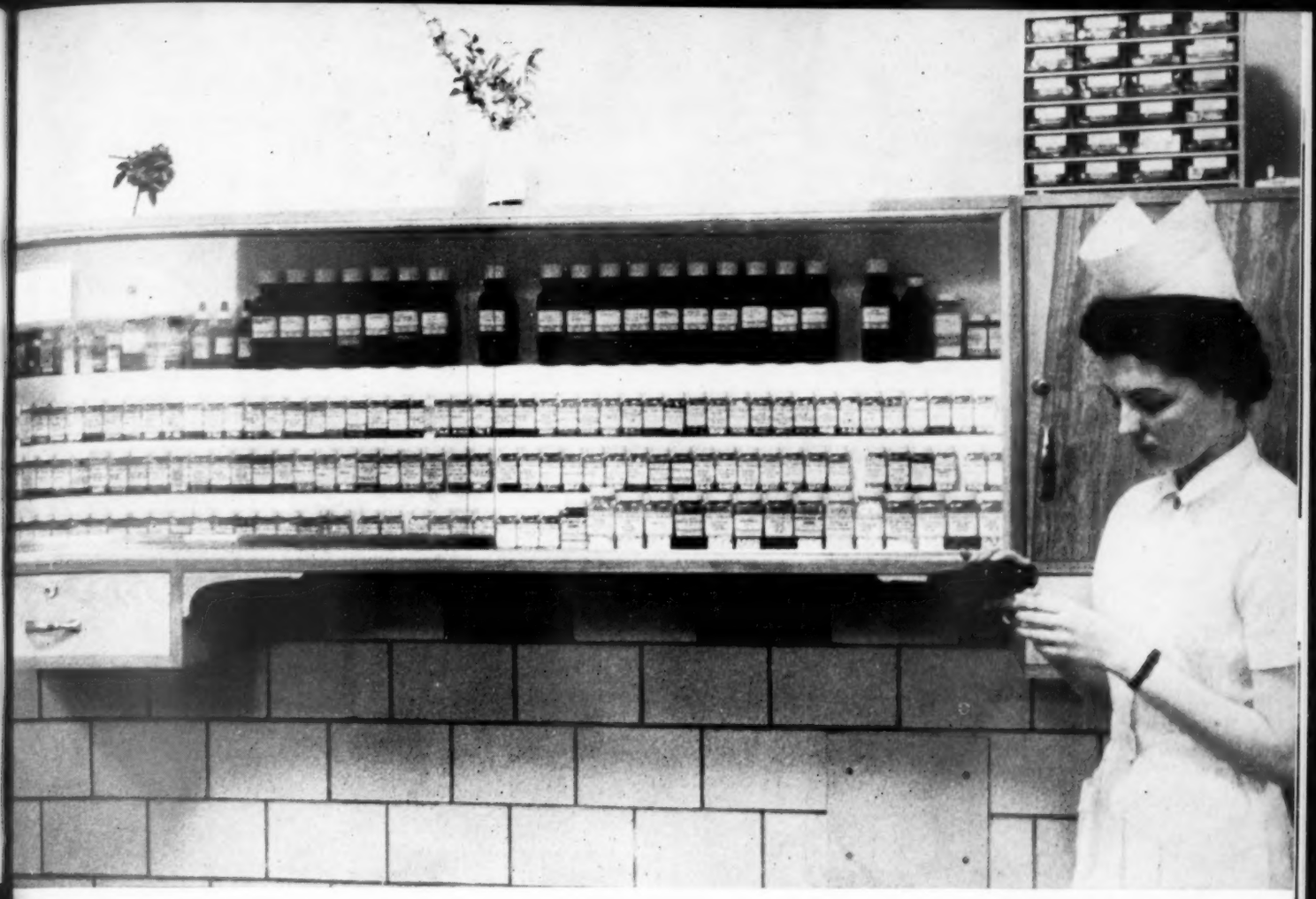
the pharmacy department of the

METROPOLITAN HOSPITAL CLINICS

Detroit

by EDWARD SUPERSTINE



Nursing Station Cabinet, Metropolitan Hospital

► IT IS THE INTENT OF THE AUTHOR TO PRESENT in this departmental description, which in itself is not a novelty to this JOURNAL, the portrayal of pharmaceutical activities in a small community hospital. That a hospital of little more than 100 beds with a modest outpatient activity can utilize the full-time services of three registered pharmacists is a matter not yet generally accepted by many administrators in the hospital field. The author is convinced that, in an effort to provide the best possible pharmaceutical service and in the interest of better patient care, we are justified in this staffing pattern.

This article, aside from a brief description of our hospital proper and its staff, is a description of the various functions and responsibilities of a pharmacy department that might be present in any of several hundred hospitals throughout the country. We are, however, most indebted to the progressive administration which has worked closely with the pharmacy department and is largely responsible for the scope of that department and our hospital as a whole.

EDWARD SUPERSTINE is Chief Pharmacist, Metropolitan Hospital Clinics, Detroit, Michigan and Instructor in the College of Pharmacy, Wayne State University.

Open Staff Hospital

The Metropolitan Hospital is an open staff, nonprofit community hospital dedicated to the care of the sick and injured. We have an outpatient department associated with the hospital and the average number of outpatient visits is approximately 100 per day. Our hospital has a bed capacity of 108 and our institution enjoys accreditation status with the Joint Commission.

Our hospital is small enough to embody a spirit of warmth among all personnel and patients are aware of the genuine feeling of goodwill that is manifest in our institution.

Although we are not, in the strict sense, a teaching hospital, our staff members hold meetings regularly and an academic atmosphere prevails. A sample schedule of monthly meetings is illustrated. Our Education Committee is responsible for the meeting and seminar content. Pharmacy is represented at all

medical conferences and presents pertinent data of a chemical and pharmacological nature at seminars on a regular basis.

Pharmacy Staff

As was mentioned earlier, our staff consists of three registered pharmacists and, in addition, a one-half time pharmacy helper messenger. Our routine work load is made up of both inpatient and outpatient dispensing, a modest bulk compounding program including the preparation of parenterals, ordering of drugs and other supplies, receiving ordered materials and checking invoices, and maintaining a modest prepackaging program which represents approximately 30 percent of our outpatient prescription load.

Room where outpatients wait while prescriptions are being filled.

Inpatient Service

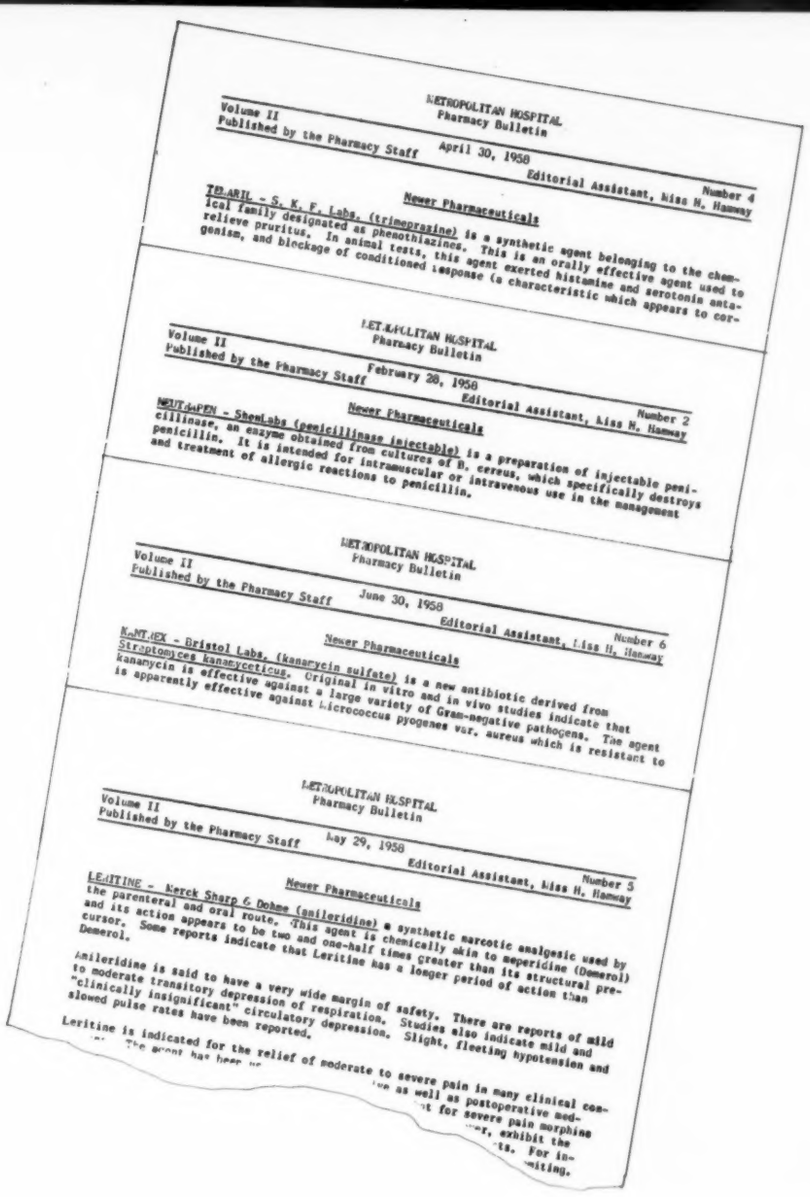
Orders for inpatients, by and large, are handled on an individual basis whenever possible. Tablets and capsules for inpatients are packaged in cardboard "one-time-use" drug containers. These drug boxes have typewritten labels that indicate the patient's name and room number, generic and trade names of the item, potency of the dosage form and complete directions for use. Liquid medications are packaged in prescription bottles and these again are only used once. When medication containers reach the floor, they are stored in respective units which are labeled according to room number.

We maintain a variety of pharmaceutical items on a ward stock basis and there is no *per se* charge for these familiar and economical medicinals and supplies. There is a daily pharmacy charge which allows for this ward stock system of distribution. Multiple dose medication containers are stocked on the floors and when these items are used, a pharmacy charge slip is filled out by the medication nurse and sent to the pharmacy. The slip is priced in the pharmacy and then sent to the business office for posting to the patient's account. When the pharmacy is closed, drugs are procured from all-inclusive medication cabinets that are found at each nursing station. Again, a pharmacy charge slip is filled out by the medication nurse and sent to the pharmacy in the morning.

Our outpatient prescriptions are filled in the same area used for inpatient dispensing; however, outpatient orders have a priority except for the occasional *stat* or emergency order. We attempt to have patients wait as short a time as possible for their medication needs.

Pricing System

All pharmacy stock items have the cost price on each package. This cost for tablets and capsules is expressed as the price per unit of 100. This system is utilized so that we may determine the actual material cost of each prescription without having to refer to a filing system for this data. A second figure known as the pricing cost is also affixed to each bottle of tablets or capsules etc. The pricing cost is usually the figure that represents the cost of the smallest unit of a particular item when purchased through the wholesale distributor. By utilizing these two figures, that is, the actual cost and pricing cost we are able to determine, through the use of two numerical projection charts, the actual material cost of each prescription as well as the price to the patient for his prescription. A sample pricing label is shown and indicates that the cost of 100 tablets of the particular item is $1.10 and further that the pricing cost for 100 tablets is $1.60. If we were to receive a prescrip-



METROPOLITAN HOSPITAL
Pharmacy Bulletin
Volume II
Published by the Pharmacy Staff
April 30, 1958
Number 4
Editorial Assistant, Miss M. Hamway

Newer Pharmaceuticals

TRILAFON - S. K. F. Labs. (trimeprazine) is a synthetic agent belonging to the chemical family designated as phenothiazines. This is an orally effective agent used to relieve pruritus. In animal tests, this agent exerted histamine and serotonin antagonism, and blockage of conditioned response (a characteristic which appears to correlate with tranquilizing activity).

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Published by the Pharmacy Staff
February 28, 1958
Number 2
Editorial Assistant, Miss M. Hamway

Newer Pharmaceuticals

NEUTRAPEN - SheaLabs (penicillinase injectable) is a preparation of injectable penicillinase, an enzyme obtained from cultures of B. cereus, which specifically destroys penicillin. It is intended for intramuscular or intravenous use in the management and treatment of allergic reactions to penicillin.

METROPOLITAN HOSPITAL
Pharmacy Bulletin
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Published by the Pharmacy Staff
June 30, 1958
Number 6
Editorial Assistant, Miss M. Hamway

Newer Pharmaceuticals

KANTREX - Bristol Labs. (kanamycin sulfate) is a new antibiotic derived from Streptomyces kanamyceticus. Original in vitro and in vivo studies indicate that kanamycin is effective against a large variety of Gram-negative pathogens. The agent is apparently effective against Micrococcus pyogenes var. aureus which is resistant to

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May 29, 1958
Number 5
Editorial Assistant, Miss M. Hamway

Newer Pharmaceuticals

LEritine - Merck Sharp & Dohme (anileridine) a synthetic narcotic analgesic used by the parenteral and oral route. This agent is chemically akin to meperidine (Demerol) and its action appears to be two and one-half times greater than its structural precursor. Some reports indicate that Leritine has a longer period of action than Demerol.

Anileridine is said to have a very wide margin of safety. There are reports of mild to moderate transitory depression of respiration. Studies also indicate mild and "clinically insignificant" circulatory depression. Slight, fleeting hypotension and slowed pulse rates have been reported.

Leritine is indicated for the relief of moderate to severe pain in many clinical con-
...ve as well as postoperative med-
...t for severe pain morphine
...er, exhibit the
...ts. For in-
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Examples of Pharmacy Bulletins, Metropolitan Hospital

tion for 50 of said tablets, for example, then we would show the following fraction on the face of the prescription:

$$\frac{.55}{1.25} \quad \text{or} \quad \frac{\text{Actual cost}}{\text{Price to patient}} \qquad \begin{matrix} \text{AC } 1.10 \\ \text{PC } 1.60 \end{matrix}$$

The figure $1.25 is based upon the pricing cost of $1.60 and is easily read from our pricing charts which allow for the dispensing of uniform numbers of tablets or capsules such as; 6, 10, 12, 18, 20, 25, 30, 36 etc. The value of these figures is apparent when we prepare our monthly reports of cost of medications dispensed to outpatients and gross revenue produced through outpatient prescriptions.

Outpatient Prescriptions

Outpatient prescriptions are labeled with the conventional shop label and carry a warning in red to "Keep Out Of Reach Of Children." Our prescription blanks allow space to indicate refill directions and no problems are encountered when we are confronted with refill requests. The back of the prescription is utilized to record refill information and it is, therefore, a simple task to look up any patient's refill record.

Our prescription blank is a two-part form of the no-carbon variety. The original prescription is filed in the usual numerical fashion while the duplicate is filed alphabetically. In this manner, it is not difficult to find a patient's prescription record, even though he may have failed to bring his container or prescription number when requesting a refill.

Discharge prescriptions are sent to the pharmacy early in the morning on the day of anticipated discharge. The filled prescription is sent to the cashier's office where it is picked up by the patient as he leaves the hospital. This helps to keep traffic to a minimum during the morning hours and keeps fewer people in the pharmacy waiting room. It is also a help to patients when we consider that in many cases their strength does not warrant a tour of the hospital at the time of discharge.

A view of the prescription counter

Improvements and Records

With the aid of our hospital cabinet-maker, we have been able to execute several changes in our department which make for easier working conditions and, we feel, a neater appearing pharmacy. Our cabinet-maker's contributions include: racks for dispensing and storage utilizing five-gallon bottles, prepackaged stock storage bins, label holders, medication cabinets for our floors and clinic, and a dispensing counter fixture with facilities that promote rapid dispensation and packaging of drugs to outpatients as well as hospital patients.

Record keeping in our department entails the usual perpetual inventory on narcotics and alcohol and also administration records for barbiturates as well as narcotics. We maintain records of all incoming drugs and supplies, and purchase orders are initiated in the pharmacy. Invoices are checked in the pharmacy and then payment is authorized and the invoices are turned over to our accounts-payable department. An annual physical inventory is taken by the pharmacy staff and a monthly record of purchases is maintained by our Chief Accountant.

As we mentioned earlier, a record of medication costs for outpatient prescriptions is maintained by the pharmacy department as well as a record of total outpatient receipts. We price all requisitions to the various departments including clinic stations and operating rooms and these are also tabulated on a monthly basis. These figures have been found to be of great value in determining departmental progress and for the purpose of submitting periodic reports to the administration.

Information Service

The pharmacy department maintains an up-to-date literature file and provides information on loan to physicians and nurses. All literature is marked as pharmacy information file material and its return is requested so that we may assure ourselves of a complete file of commercially available products at all times.

The pharmacy department publishes a monthly *Pharmacy Bulletin* as well as periodic drug information sheets which are distributed to all of our physicians and nurses. The preparation of both Bulletin and information sheets is a very rewarding task for the pharmacy staff since it is one of the best methods of keeping abreast of timely information in pharmaceutical as well as medical circles.

We are generally in the process of evaluating three or four research drugs and these are all controlled by and stocked in the pharmacy. Rules and regulations for use emanate from our Pharmacy and Therapeutics Committee.

We do not, as yet, have our own formulary but this is a "near-future" project. We are giving serious thought to the adoption of the *American Hospital Formulary Service* and it now appears that this shall be the answer to our formulary problem.

All medical service representatives are seen in the pharmacy. Facilities are available for them to display and discuss their new products with our medical staff.

The library within the pharmacy is modest but does contain all of the more important texts and the compendia of pharmacy as well as a liberal number of pharmaceutical journals. The general library of the hospital has a more complete and up-to-date journal grouping and maintains the standard works in medicine and surgery which we use when we find our facilities wanting.

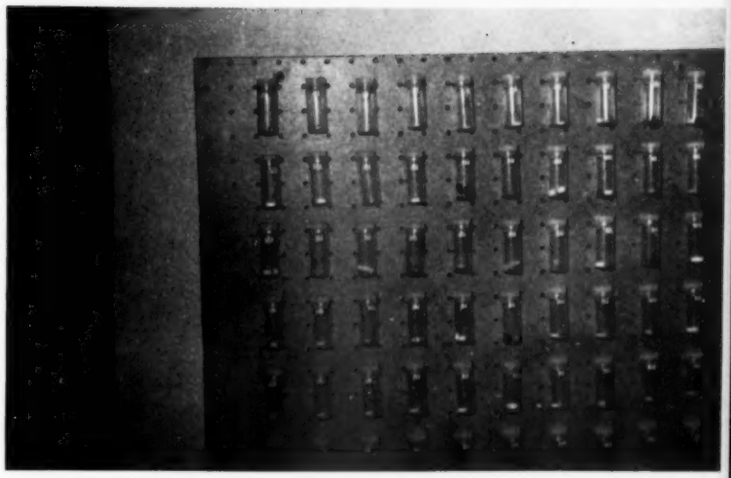
Our department has prepared lectures for the nursing department and has participated in programs of continuing education for our nursing staff. Our many telephone calls attest to the fact that the pharmacy serves as a drug information center for our medical and nursing staff.

Emergency pharmaceutical service is available on a twenty-four hour basis; however, we are happy to be able to write that this service has never been abused.

Philosophy of Service

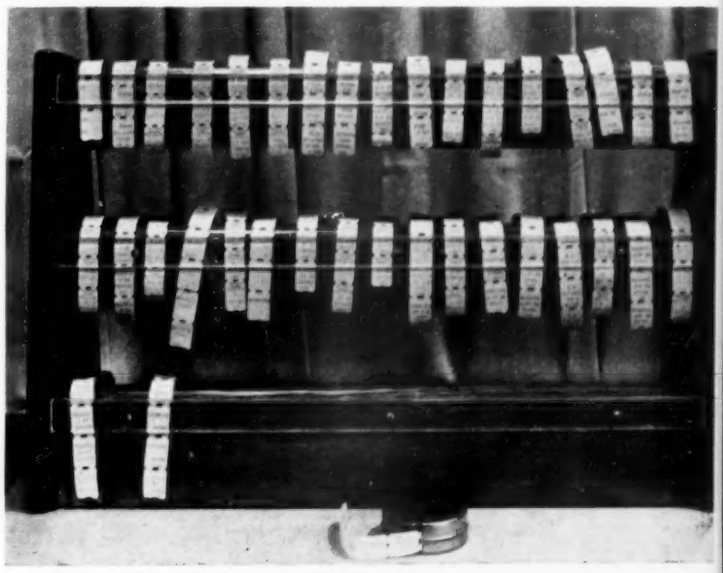
In conclusion, we would be remiss if we failed to mention something of the motivating forces behind the scenes. Something of the nature of the philosophy of hospital pharmacy is certainly in order. Although policies and procedures in our departments may be flexible or steadfast, one guide is always positive and clear. We, as hospital pharmacists, have a duty and a responsibility to the patient. This is the individual who makes our existence possible and we must aim our efforts in his direction at all times. Dr. Francke put it well when he wrote, "Surely, we in hospital pharmacy must constantly reaffirm this fundamental concept of service—service to the patient, to the physician, to the administrator, to the nurse, and to others concerned with patient care. Service cannot be given in a vacuum. We cannot demand dignity or respect or prestige. But we can earn them. Herein lies the secret of a continued progress in hospital pharmacy. Herein lies the secret of a professional life filled with challenging opportunities. Herein lies the secret of a full and happy professional life."

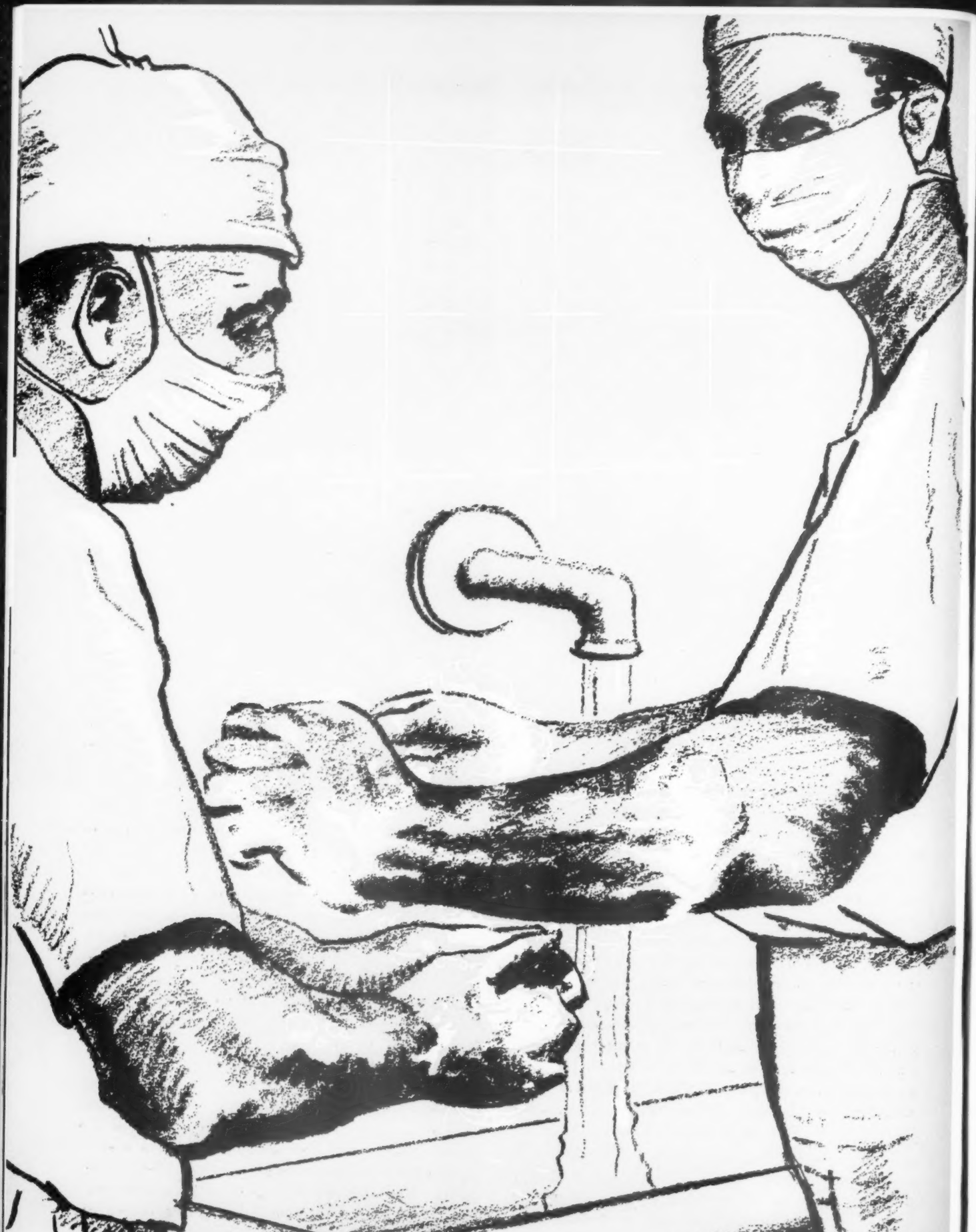
There is little that might be added to these fine words of truth and wisdom. If we can remember this philosophy and if we pass it on to others, we are performing a service vital to our profession in particular and important to our hospital field in general.

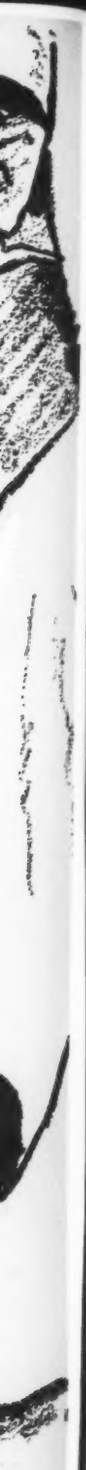


ABOVE: *A visual aid for identifying tablets serves as a useful tool to the physician, nurse and pharmacist*

ABOVE: *Prepackaged stock aids in providing efficient service.*
BELOW: *Holder for labels used to mark prepackaged stock.*







a study of

SURGICAL SCRUB SOAP FORMULATIONS

by SEYMOUR M. BLAUG AND DONALD S. EBERSMAN

► CLEANSING AND STERILIZATION OF THE HANDS AND FOREARMS of the surgeon and the skin of the patient are an integral part of modern surgical technics. Modern methods of surgery could never have developed had it not been for the concept of aseptic surgery. The importance of cleanliness in conjunction with surgical procedures cannot be exaggerated. For many years soap and water were the most effective and most widely used agents for this purpose. The first step of the procedures used consisted of the mechanical cleansing of the skin, generally using a small brush. The time allowed in the procedure varied from one institution to another. After the rinse the skin was treated with a suitable germicidal agent.

By scrubbing in this manner for about seven to eight minutes all the transient bacteria may be removed; however, it takes over 15 minutes of scrubbing before appreciable numbers of resident bacteria appear in the wash water. It has been noted by Walker[1] that while the pneumococci and streptococci are highly susceptible to soap the staphylococci are not. Price[2] in his early works on the subject reported that with scrubbing there is a reduction in the flora at a constant logarithmic rate, roughly by one-half each six minutes or by two-thirds each ten minutes. Thus, it would theoretically take two and one-half hours to sterilize the skin. In later years Price[3] stated that it is not possible to sterilize the skin without destroying it.

Many attempts were made to incorporate a germicidal agent into the scrub soap. The earliest attempts were made by Koch in the latter part of the nineteenth century. The agents tried either formed inactive compounds with the soap or were inactivated by the excess alkali present. In the early nineteen forties a series of phenolic compounds were developed which appeared to be much more successful than the earlier agents. The most promising of these agents was chemically a 2,2′-methylenebis (3,4,6,-trichlorophenol). It is known commercially as G-11* or hexachlorophene. The compound is soluble in alcohol, acetone, ether, chloroform, and in dilute solutions of the alkalies. It was noted that soap enhances the action of hexachlorophene. Very dilute solutions of the compound have a bacteriostatic action, so that even in very hard water the soap solution is effective as a germicidal agent. Traub *et al*[4] in 1944 reported that a person using a two percent G-11 soap has a lower residual count after two minutes of washing than one who washed for 20 minutes with ordinary

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*See Appendix 1, page 891

soap. It has also been determined that although it is possible to get as low a plate count using just soap scrub and antiseptic rinse as when using the hexachlorophene liquid soap, after two hours (the estimated average time of an operation) there is a much greater count in the preparation without the G-11. The difference in count is even greater if the person is a regular user of the soap with hexachlorophene. It has been stated[5] that the time of wash with the G-11 soap depends upon the previous exposure to the soap. For those using it regularly the time would be two minutes; for those using it daily, three and one-half minutes; those using it for the first time or after a lapse of more than two days, ten minutes. The reason for the differences in the time is that hexachlorophene may be deposited on the skin as a film which may be removed by organic solvents but not by detergents. Fahlberg *et al*[6] found hexachlorophene present on the skin two days after discontinuing the use of a liquid soap containing one percent hexachlorophene. Other agents have recently been introduced which have actions similar to G-11 and may prove valuable in pre-operative scrub soaps. These agents are bithionol called Actamer* and tetra methyl thiuram disulfide called TMTD.

The major disadvantages of soaps are that they are irritating when used repeatedly, they interfere with the acid mantle of the skin, they are affected by hard water, and many people are allergic to them.

In the latter nineteen forties a detergent lotion was developed containing three percent hexachlorophene. This product was marketed under the name pHiso-Hex.* Numerous tests by physicians in various fields of medicine and a history of reliable clinical use have proved the many advantages of this product over soap combinations with hexachlorophene. Harrison and Cockroft[7] in 1952 compared a liquid soap containing hexachlorophene with pHisoHex. They found that there is a slight difference in the reduction of the number of bacteria on the hands immediately after scrubbing. In a period of two hours the pHisoHex prevented the multiplication of bacteria to a much greater degree than the soap-hexachlorophene liquid. This fact is extremely important as there appears to be an acceleration of the rate of multiplication of

*See Appendix 2, page 891

bacteria under rubber gloves. A three-minute scrub period is recommended by the manufacturer who also states that a brush is unnecessary. However, at the University Hospitals, State University of Iowa, a longer period of scrubbing is used as well as a brush. A rinse in a 1:1,000 aqueous solution of benzalkonium chloride may be used but this procedure is not followed at the University Hospitals. An alcohol-containing rinse should not be used as this may remove a portion of the hexachlorophene deposited on the skin. While the degree of sensitization to this combination is quite low, upon long-term widespread use, cases of allergic reactions have been noticed. This is a not uncommon characteristic of the synthetic detergents.

Work was started at the State University of Iowa to develop a new detergent lotion containing a germicidal agent. The purpose of this project was twofold: first, a number of the surgeons at the University Hospitals are sensitive to the preparations now being used in the operating rooms. This sensitivity was so bad in one case that the physician had to stop operating for a period of time in order to permit his hands to heal. The second reason is that of economy; the commercial products available are quite expensive and it was thought that if a product were manufactured in the laboratories of the College of Pharmacy there would be a considerable financial savings to the hospital.

A number of formulations were developed using only anionic surfactants. While these agents produced an acceptable degree of foam, it was short lived. The products which contained a high concentration of the surface active agent were not very stable on standing. A high degree of creaming was observed even in short periods of time. Finally, a series of combinations of predominantly anionic surfactants with small amounts of non-ionic surfactants were found to be stable.

Clinical Tests

The next step in the study was the clinical testing of the product both for efficiency and incidence of sensitivity. Upon consulting with the Department of Dermatology at the University Hospitals it was decided not to use patch tests. It was the opinion of the dermatologists that patch testing in work of this type does nothing in many cases but sensitize the person to the detergent. Also, many people are allergic to the adhesive used on the patches. It was agreed that the testing was to be done on as large a group as possible, consisting of both men and women. The persons selected should not, if possible, come in contact with alcohol or other organic solvents routinely. It was for this reason that the nursing staff at the hospital was not used to test the final products. All of the females chosen were students at the State University of Iowa, the majority in the College of Liberal Arts. The majority of the males were senior students in the College of Pharmacy. The ages of the participants were between 18 and 29. The average age of the group was 21.2. Over a period of three months a group of 39 persons, 26 women and 13 men used the detergent lotions for varying periods of time. As there has been much work done on the efficacy and allergic reactions of hexachlorophene, this compound was omitted in the formulations for testing. In this way a variable that might cause an allergic reaction was eliminated. The participants were told to wash their hands with the lotion at least twice daily using about three to five milliliters each time. In addition, they were instructed not to change their regular cleansing procedure, thus reproducing normal usage of these products. The hands were observed approximately once weekly for any changes in the skin color or texture.

At the conclusion of the clinical trial a series of bacteriological tests were run. The purpose of these was to determine if the amount of non-ionics present was enough to inactivate the concentration of hexachlorophene present. Using a technic of taking samples of wash water from sterile basins and culturing the aliquots, a series of results were obtained.

As surface tension is important to detergency in the wetting of the skin and the removal of dirt particles, the surface tension lowering effect of the final formula was compared to solutions of various detergents and soap combinations.

The secretions of the skin normally have an acidic *p*H, while the commonly used soaps are alkaline. The skin has a buffer system which tends to neutralize this excess alkali. Upon repeated and prolonged usage of soap, as is necessary in a surgical scrub, the buffer tends to become exhausted. Additional alkali may cause irritation and a weakening of the body's defense against bacteria. For this reason the formulations were all buffered with lactic acid using a Beckman Pocket *p*H meter. The *p*H chosen was 5.5 as this most closely approximated the normal *p*H of skin secretions.

Experimental, Method of Preparation

The waxes and oil were heated together to a temperature of 70°. The detergents used (surfactants) in the formulations were added to the heated oil solution. To this mixture was added the heated aqueous phase containing any water-soluble ingredients. The lotion was stirred until cool, buffered with lactic acid to *p*H 5.5, then homogenized using a hand homogenizer for small batches or a Gaulin 4" colloid mill for large batches (over 1,000 ml.).

If hexachlorophene, Actamer, or other germicidal ingredients were to be incorporated in the lotion, they were added to the melted oleaginous phase. Sorbic acid, 0.1 percent, was added to the lotion as a preservative. In hospital operating rooms, liquid soaps are generally used in

Formulations Used in Developing a Detergent Lotion to which a Germicidal Agent was Added

	A1	A2	A3	A4	B1	B2	B3	B4	C1	C2
Nacconal 60 S	40	50	50	40	–	–	–	–	–	–
Alrosol C	10	10	–	10	–	–	10	–	5	10
Brij 52	10	5	10	–	2.5	–	5	10	–	5
Triton X-100	–	–	5	10	–	5	50	40	–	–
Stepanol TBK	–	–	–	–	30	25	–	–	–	–
Stepan P-616	–	–	–	–	9	5	–	–	–	–
Sarkosyl NL30	–	–	–	–	–	–	–	–	60	65
Pluronic F-68	–	–	–	–	–	–	–	5	–	–
Amerchol CAB	2	1	2	2	1.5	1	2	3	2	–
G-1790	–	–	–	–	–	–	–	2	–	2
Glyceryl Monostearate	–	–	–	1	–	–	–	–	1	1
Alrowax	–	1	1	1	2	0.5	–	–	–	–
Carbowax 4000	–	–	1	–	–	1	1	1	–	1
Methylcellulose 1500	0.5	.75	.5	.5	–	0.75	0.5	0.5	0.5	0.5
Distilled water	17.5	15	15	20	50	10	20	20	10	10
White petrolatum	20	22.5	15.5	15.5	–	2	11.5	18.5	21.5	5.5
Liquid petrolatum	–	–	–	–	5	–	–	–	–	–

	C3	C4	C5	C6	C7	C8	C9	D1	D2	D3
Sarkosyl NL 30	10	–	–	–	–	–	25	–	–	–
Sarkosyl O	20	–	–	25	20	25	25	–	–	–
Sarkosyl S	–	25	20	–	–	–	–	–	–	–
Triton X-100	–	5	–	–	–	10	–	60	40	30
Alipal CO-436	–	–	10	–	10	10	–	10	10	30
Emulphogene BC-840	–	–	–	5	–	–	10	5	10	10
Brij 52	2.5	5	5	5	10	5	5	–	5	–
Cetyl Alcohol	–	–	1	–	1	–	–	1	1	1
Lantrol	1	2	–	–	–	–	–	–	–	–
Amerchol CAB	–	–	–	3	2	2	2	1	–	2
G-1790	–	–	2	–	–	–	–	–	2	–
Alrowax 95	–	–	–	1	–	2	1	–	1	1
White Petrolatum	5	10	10	10	10	5	10	14.5	15	10
CMC	–	0.5	–	–	0.5	–	–	–	–	–
Methycellulose	–	–	0.75	0.5	–	0.5	0.5	0.5	0.5	0.5
Carbowax 4000	–	1	1	–	–	1	1	–	1	1
Distilled water	35	26.5	25	25.5	20	10	20.5	8	14.5	14.5
Triethanolamine	20	25	20	25	20	25	–	–	–	–
Liquid petrolatum	6.5	–	5	–	6.5	4.5	–	–	–	–

	D4	E1	E2	E3	E4	F1	F2	G1	G2	G3
Sipon ES	–	–	10	10	–	–	–	25	25	25
Alrosol C	–	–	–	–	–	–	–	10	–	–
Igepal CO-630	–	–	–	–	–	–	–	–	25	–
Hyonic PE 250	–	50	50	25	25	–	–	–	–	–
Nínol AA62	–	10	10	25	–	25	20	25	–	–
Tween 80	10	–	–	–	5	–	–	–	10	–
Brij 52	5	5	–	5	–	–	5	5	5	10
Emulphogene BC-840	10	–	–	–	25	25	–	–	–	–
Alipal CO-436	50	–	–	–	–	–	25	–	–	25
Alrowax 95	–	1	1	–	2	1	1	1	1	–
Carbowax 4000	1	1	1	2	–	–	1	1	–	2
Methylcellulose 4000	.5	1	.5	1	1	2	1	.5	.5	1
White petrolatum	11.5	15	10	10	15	15	15	15	15	20
Liquid petrolatum	–	–	–	–	5	–	5	–	5	–
Distilled water	10	15	15.5	20	20	30	25	15.5	11.5	15
Amerchol CAB	–	2	2	–	2	2	2	–	2	2
Lantrol	2	–	–	2	–	–	–	2	–	–

	G4	G5	G6	G7	G8	G9
Sipon ES	40	40	50	50	50	50
Alrosol C	–	20	5	10	10	10
Igepal CO-63	20	–	5	10	10	10
Brij 52	5	5	5	–	–	–
Alrowax 95	1	1	–	2	2.5	2.5
Carbowax 4000	–	–	2	2	2	2
Methylcellulose 1500	1	1	–	–	–	–
Methylcellulose 4000	–	–	–	.5	1.5	1.5
White petrolatum	10	10	5	8	4	4
Liquid petrolatum	-	–	10	–	–	–
Amerchol CAB	2	2	2	–	–	2
Solulan 98	-	–	–	–	2	–
Lantrol	-	–	–	2	–	–
Distilled water	21	21	15	16.5	18	18

Appendix 1. Surfacants Used in the Formulations

Surfactant	Chemically	Manufacturer	Anionic or Non-Ionic
Alipal CO-436	Ammonium salt of sulfate ester of an alkylphemoxy polyoxyethylene ethanol	Antara Chemicals New York, New York	Anionic
Alrosol C	Fatty amide	Geigy Chemical Corp. Yonkers, New York	Non-ionic
Emulphogene BC-840	Polyoxyalkylene ethanol	Antara Chemicals	Non-ionic
Hyonic PE 250	Ethylene oxide condensate	Nopco Chemical Co. Harrison, New Jersey	Non-ionic
Igepal CO-630	Nonyl phenoxy polyoxyethylene ethanol	Geigy Chemical Corp.	Non-ionic
Nacconal 60S	Alkyl aryl sulfonates	National Aniline New York, New York	Anionic
Ninol AA62	Amine condensate	Ninol Laboratories Chicago, Illinois	Non-ionic
Renex 648	Nonyl phenoxy polyoxyethylene derivatives	Atlas Powder Co. Wilmington, Delaware	Non-ionic
Sarkosyl NL 30	Sodium lauryl sarcosinate 30%	Geigy Chemical Corp.	Anionic
Sarkosyl O	Oleyl sarcosine	Geigy Chemical Corp.	Anionic
Sarkosyl S	Stearoyl sarcosine	Geigy Chemical Corp.	Anionic
Sipon ES	Sodium lauryl ether sulfate	American Alcolac Corp. Baltimore, Maryland	Anionic
Stepan P 616	Alkanolamide	Stepan Chemical Co. Chicago, Illinois	Non-ionic
Stepanol TBK	Alkoxy polyoxyethylene ethanol	Stepan Chemical Co.	Non-ionic
Triton X-100	Alkyl aryl polyether alcohol	Rohm and Haas Co. Philadelphia, Pennsylvania	Non-ionic

Appendix 2. Surfacants Used in the Formulations

Agent	Chemically	Manufacturer
Actamer (Bithionol)	2,2'-Thiobis- (4,6 dichloro phenol)	Monsanto Chemical Co. St. Louis, Missouri
Alrowax	Hydrophilic wax	Geigy Chemical Corp.
Amerchol CAB	Lanolin alcohols	American Cholesterol Products Inc. Edison, New Jersey
Brij 52	Polyoxyethylene stearate	Atlas Powder Co.
Carbowax 4000	Polyethylene glycol 4000	Union Carbide and Carbon Chemicals Co. New York, New York
Cellosize WP 4400	Hydroxyethyl cellulose	Union Carbide and Carbon Chemicals Co.
CMC	Sodium carboxymethylcellulose	Hercules Powder Co. Wilmington, Delaware
G-11 (Hexachlorophene)	2,2'-Methylenebis-(3,4,6 trichlorphenol)	Sindar Corp. New York, New York
G-1790	Polyoxyethylene lanolin derivative	Atlas Powder Company
Lantrol	Liquid fraction of lanolin	N. I. Malmstrom & Co. Brooklyn, New York
Methocel 1500 1400	Methylcellulose 1500, 4000	Dow Chemical Co. Midland, Michigan
pHisoHex	Synthetic detergent containing 3 percent hexachlorophene	Winthrop Laboratories New York, New York
Pluronic F-68	Polyoxyalkylene non-ionic	Wyandotte Chemicals Corp. Wyandotte, Michigan
Solulan 98	Acetylated lanolin derivative	American Cholesterol Products Inc.
Tween 80	Polyoxyethylene sorbitan monooleate	Atlas Power Co.

wall dispensers which contain metal parts. To prevent corrosion or discoloration, especially if Actamer is present, 0.1 percent of disodium tetraacetic acid was added. Sorbic acid and disodium tetraacetic acid were incorporated in the aqueous phase of the formulations.

Finished products were stored at room temperature and at 40° for 8 weeks and observed weekly for creaming and color change. In the series of formulations A through F, all the products exhibited varying degrees of creaming. Their viscosities varied from a thin liquid to a very viscid paste. Color varied from a creamy white to a deep tan. In the G series of formulations, little or no creaming was observed. Viscosity was such that the lotions could be poured easily from a standard prescription type bottle. Formulations G-8 and G-9 were chosen for clinical evaluation.

Experimental, Testing

As stated previously, a group of 39 persons was chosen to test formulas G-8 and G-9. The participants washed their hands with the products twice daily for various periods of time. A group of 10 girls were the first subjects to test the products. The members of this group used the lotions a total of 156 times over a 90 day period. Of this original group there was no incidence of sensitivity and no allergic reactions. The most serious complaint was that the products were slightly drying to the skin. The consensus of the group was that the products tested were excellent cleansing agents. The products foamed to an acceptable degree even in the hard water of Iowa City. The hands did not feel unpleasant after use or extremely

dry. The only complaint that seemed universal with the females taking part in this test was that the products were not perfumed. The perfume was left out in order to eliminate as many variables as possible that might produce an allergic reaction. The formulas were varied slightly during the course of the test to arrive at a formula that would be least drying. Formula G-8 was selected as the most stable and least drying of the group tested.

In the second group consisting of 16 women of the same age group and academic program, some reactions were noted to formulas G-8 and G-9. In the entire female group there was one serious case of sensitivity to formula G-8. This manifested itself in the form of cracking and severe peeling of the skin which ceased when usage of the product was stopped. It was later determined that the subject was also sensitive to another commercially available product of the same type. Two other cases of sensitivity occurred in which excessive drying and occasionally a cracking of the skin were observed. In the male group the consensus was that the lotions were drying and in two cases the men had to be withdrawn from the study. This group also concurred that the products were excellent cleansing agents and pleasant to use. The lack of odor was not an important factor in this group. The difference in opinion as to the drying quality may be due in part to the fact that some of the women use a hand lotion after washing while the men do not.

A series of bacteriological tests were run on formula G-8 containing 3 percent hexachlorophene. A batch of lotion was manufactured according to the accepted formula except it did not contain any non-ionic surfactants. A 5 ml. portion of this was used as a scrub for five minutes. The participants washed and rinsed their hands in a sterile basin using sterile distilled water. An aliquot of the wash water was taken and plated using nutrient agar. After 48 hours incubation at 37°, a colony count was taken. The plates were found to contain no evidence of bacterial growth. The above experiment was repeated except that to the wash water sterile 50 ml. portions of a 20 percent solution of the non-ionic agents were added and aliquots taken after each addition. After 48 hours incubation at 37° the following results were observed:

1.	50 ml. non-ionic added	count	210,000 average
2.	100 ml. added	count	348,000 average
3.	150 ml. added	count	417,000 average

The surface tension lowering effect of formula G-8 (5 ml./liter) was determined using a Cenco-DuNuoy model 10402 tensiometer. For comparison a commercial liquid soap (10 ml./liter) and a commercially available detergent lotion (5 ml./liter) were used.

1.	Soap	26.4 dynes/cm.
2.	Commercial detergent	35.0 dynes/cm.
3.	Formula G-8	35.9 dynes/cm.

Discussion

In formulating a detergent emulsion lotion based on synthetic detergents, large amounts of detergent must be used. This resulted in a stability problem because of the lack of balance between the oil, water and surfactant phases. Lack of stability was manifested by excessive creaming rates. Creaming was retarded by increasing the viscosity with methylcellulose but this often resulted in a lack of pourability. The finally accepted formula, G-8, contained methylcellulose and Carbowax 4000 which modified the viscosity such that the preparation was still pourable. A water dispersable lanolin derivative, Solulan 98, was used in formula G-8 instead of a more lipophilic lanolin derivative.

Another problem encountered with detergent lotions was the pronounced drying effect on the skin due, probably, to the defatting action of the anionic agents present in relatively large quantities. However, lotions based on anionic agents and non-ionic agents were found to be more acceptable as cleansing agents and foamed better than lotions based on non-ionics alone. The drying effect on the skin was lessened by incorporating lanolin derivatives in the formulations, such as Amerchol* CAB and Solulan* 98. If too lipophilic a lanolin derivative was added, such as Amerchol CAB, there was a decrease in stability (creaming rate increased). Again, this was probably due to the relatively small volumes of oil and water contained in these emulsion lotions.

In view of the widespread use of non-ionic surfactants in detergent preparations, lotions, emulsions and ointments, the results obtained from the bacteriological tests should be considered in evaluating any formulation containing non-ionic agents. Hexachlorophene contains phenolic OH groups which are free to interact with the non-ionic surfactants. This resulted in a decrease in the germicidal action of the hexachlorophene. The decrease was not pronounced since an excess of hexachlorophene was used. This probably left some unbound hexachlorophene to exert its germicidal action. Germicidal agents that do not interact with non-ionic surfactants would be the agents of choice in detergent lotions. However, the possibility of interaction occurring in any formulation containing non-ionic surfactants should not be overlooked.

Clinical results indicated the importance of evaluating preparations containing large amounts of surfactants for sensitizing potential or irritation effects. The combination of frequency of use plus the defatting action of the surfactants resulted in several cases of skin irritation.

*See Appendix 2, page 891

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GLUCOSE DEGRADATION in the presence of SODIUM LACTATE during AUTOCLAVING AT 121°

by JOHN C. GRIFFIN *and* SISTER CECILIA MARIE S.S.M.

► DISCOLORATION OF GLUCOSE SOLUTIONS during autoclaving often presents a barrier to the production of perfect parenteral solutions. More pronounced sensitivity to heat is noted when sodium lactate is added to glucose solutions. Such addition of sodium lactate to glucose solutions becomes necessary in the preparation of many commonly used parenteral solutions.

Considerable work is reported in the literature concerning decomposition of glucose solutions during sterilization. Englis and Hanahan[1] indicate that glucose solutions develop color on heating if buffers are present. McDonald[2] has shown that solutions of glucose in water are most stable to heat at *p*H 3 to 5. Evstigneev and Nikiforova[3] found that glucose solutions decompose more rapidly above *p*H 5 and degraded solutions show maximum ultraviolet absorption at 280 millimicrons. Hirayama and Kubota[4] found that the yellow coloration of glucose solutions is due at least in part to the formation of 5-hydroxymethylfurfural. Ultraviolet absorption is obtained at 284 millicrons. Voelksen[5] further found that the production of 5-hydroxymethylfurfural in glucose solutions could be prevented by adjusting the *p*H of glucose solutions to *p*H 3.5 with hydrochloric acid. Webb *et al*[6] have shown that 100°C. the conversion of glucose to 5-hydroxymethylfurfural is subject to general acid-base catalysis as indicated by the increase in the rate of decomposition with increasing concentrations of buffer ions when hydrogen ion concentration is held constant.

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Purpose of Study

The purpose of this study was to determine the effect of autoclaving time, *p*H of the sodium lactate solution added and glucose concentration on the formation of glucose degradation products contributing to the coloration of glucose solutions.

Experimental

The water used in the preparation of all solutions was first deionized and then distilled, using a Culligan triple tank deionizer and an American Sterilizer Co. Model C. 10 gallon per hour still. Only distilled water having an electrical resistance in excess of one million ohms was considered acceptable for use. All chemicals were A.R. grade except anhydrous dextrose which was Merck and Company U.S.P. grade. Solutions were packaged in 30 ml. Neutraglass vials (Kimble Glass Co.). An Amercian Sterilizer Co. autoclave equipped with Cyclomatic control was used for all sterilizations. Determinations of *p*H were made with a Fisher Titrimeter. A Beckman DU spectrophotometer equipped with ultraviolet attachment was used to determine the absorbancy of each solution. Fused silica, 10 mm. light path cells were used for all absorbancy determinations. Twelve different solutions were considered in this study:

A. Dextrose 2.5 percent with 1.57 Gm. of sodium lactate pH 5 per liter.
B. Dextrose 2.5 percent with 1.57 Gm. of sodium lactate pH 6 per liter.
C. Dextrose 2.5 percent with 1.57 Gm. of sodium lactate pH 7 per liter.
D. Dextrose 2.5 percent with 1.57 Gm. of sodium lactate pH 8 per liter.
E. Dextrose 5 percent with 3.14 Gm. of sodium lactate pH 5 per liter.
F. Dextrose 5 percent with 3.14 Gm. of sodium lactate pH 6 per liter.
G. Dextrose 5 percent with 3.14 Gm. of sodium lactate pH 7 per litter.
H. Dextrose 5 percent with 3.14 Gm. of sodium lactate pH 8 per liter.
I. Dextrose 10 percent with 3.14 Gm. of sodium lactate pH 5 per liter.
J. Dextrose 10 percent with 3.14 Gm. of sodium lactate pH 6 per liter.
K. Dextrose 10 percent with 3.14 Gm. of sodium lactate pH 7 per liter.
L. Dextrose 10 percent with 3.14 Gm. of sodium lactate pH 8 per liter.

Solutions were prepared and filled into 30 ml. Neutraglass vials. The vials were sealed using a 20 mm. pink rubber stopper and aluminum seal. Three identical groups representing the twelve solutions were assembled. Group I. was autoclaved for 15 minutes at 121° C., Group II. for 20 minutes at 121° C. and Group III. for 30 minutes at 121° C. Timing of sterilization was accomplished by setting the desired time into the Cyclomatic control of the autoclave. After sterilization the absorbancy of each solution was determined at 280 millimicrons. Determination of the *p*H of the solutions before and after autoclaving was made.

Results and Discussion

Determination of *p*H of glucose solutions prior and subsequent to autoclaving indicated that autoclaving elicits significant changes (Table I). A ten-fold change in hydrogen ion concentration may be observed in certain solutions (G) with fifteen minutes autoclaving; however; prolonged autoclaving (up to 30 minutes) does not significantly change this value.

Autoclaving time referred to as 15, 20, and 30 minutes was actually somewhat longer in each case. Actual time of autoclaving at 121°C. as well as the time required to reach sterilizing temperature and exhaust time are shown in Table II.

Maximum absorption for solution (J) occurred at 280 millimicrons as indicated by the absorption curve (Figure I) for this solution. An unautoclaved sample of solution (J) was used as a blank for determination

TABLE I. HYDROGEN ION CONCENTRATIONS OF GLUCOSE SOLUTIONS PRIOR TO AUTOCLAVING AND AFTER BEING AUTOCLAVED FOR 15, 20, AND 30 MINUTES.

SOLUTION	PRIOR TO AUTOCLAVING	AFTER AUTOCLAVING 15 MIN.	20 MIN.	30 MIN
A	5.5	4.8	4.9	4.9
B	5.4	5.5	5.3	5.3
C	5.8	5.5	5.5	5.5
D	6.9	5.5	5.2	5.4
E	5.3	4.8	4.8	4.8
F	5.7	5.5	5.3	5.3
G.	6.6	5.3	5.4	5.4
H	7.0	5.4	5.4	5.4
I	5.0	4.8	4.9	4.7
J	5.7	5.3	5.3	5.2
K	6.6	5.4	5.3	5.3
L	7.2	5.2	5.3	5.3

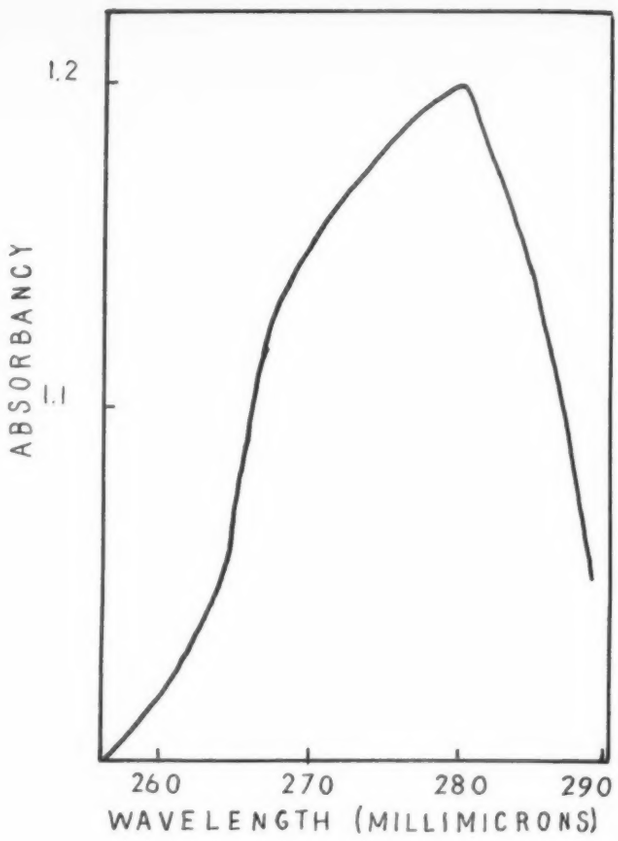

FIGURE I. ABSORPTION CURVE FOR SOLUTION (J) WITH AN UNAUTOCLAVED SAMPLE AS A BLANK.

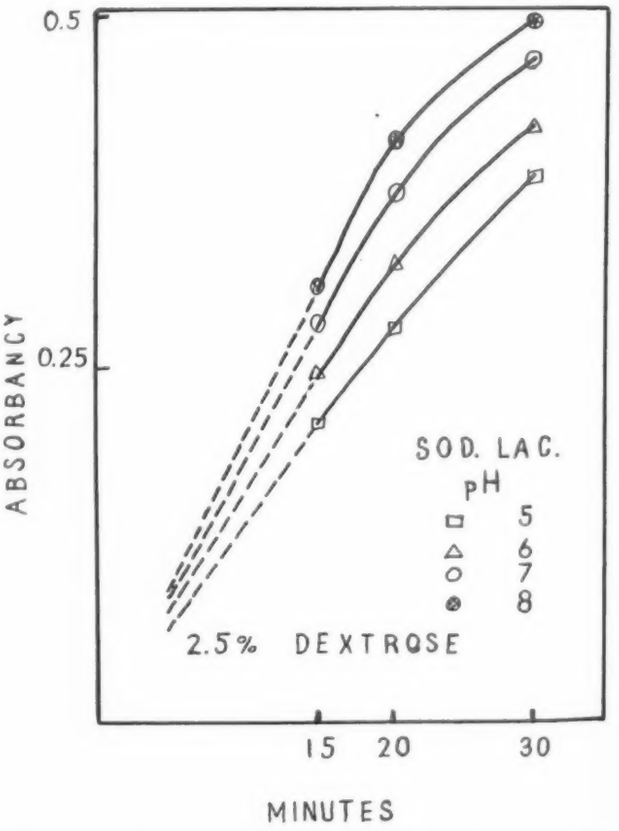

FIGURE II. ABSORBANCY AT 280 MILLIMICRONS FOR 2.5 PERCENT GLUCOSE-SODIUM LACTATE SOLUTION VERSUS AUTOCLAVING TIME AT 121° C.

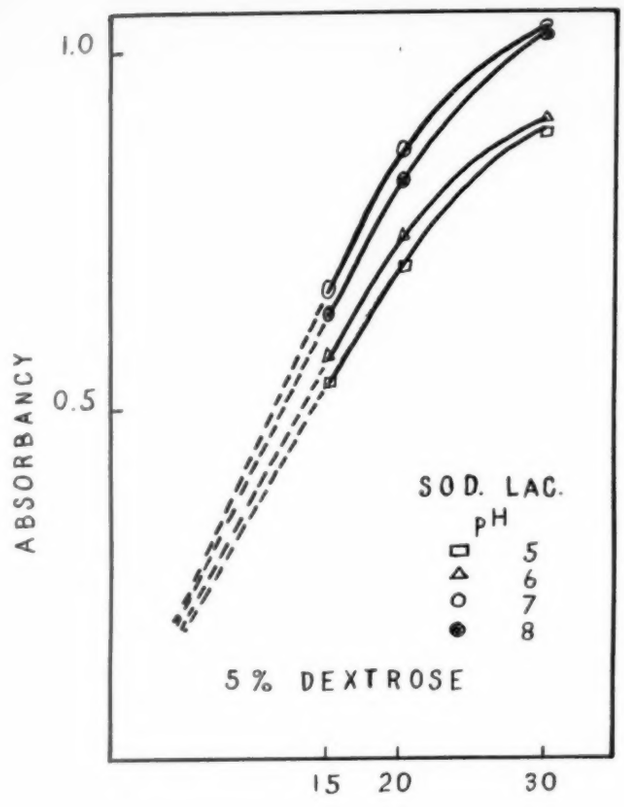

FIGURE III. ABSORBANCY AT 280 MILLIMICRONS FOR 10 PERCENT GLUCOSE-SODIUM LACTATE SOLUTIONS VERSUS AUTOCLAVING TIME AT 121°C.

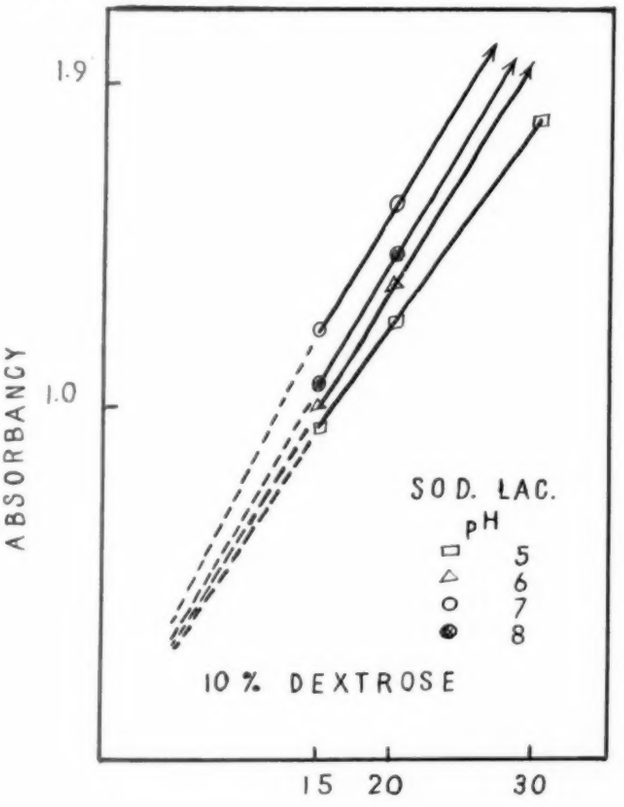

FIGURE IV. ABSORBANCY AT 280 MILLIMICRONS FOR 5 PERCENT GLUCOSE-SODIUM LACTATE SOLUTIONS VERSUS AUTOCLAVING TIME AT 121°C.

TABLE II. ACTUAL TIME OF AUTOCLAVING AT 121°C. AS WELL AS TIME REQUIRED TO REACH STERILIZING TEMPERATURE AND TO EXHAUST THE AUTOCLAVE.

CYCLOMATIC TIME	TIME TO REACH 121°C.	ACTUAL AUTOCLAVING TIME	EXHAUST TIME	TOTAL TIME
15	3	18	8	36
20	3	23	9	45
30	3	32	11	56

NOTE: All times shown in minutes.

of absorbancy curve data. An indication of the amount of glucose degradation products present in the glucose-sodium lactate solutions was obtained by determining the absorbancy of all solutions at 280 millimicrons.

Solutions of 2.5 percent glucose (Figure II) showed increased absorbancy with increasing autoclaving time and *p*H values of the sodium lactate added. Solutions of 5 percent (Figure III) and 10 percent (Figure IV) glucose showed increasing absorbancy with increasing autoclaving time. Minimum absorbancy was obtained in all glucose solutions containing sodium lactate adjusted to *p*H 5. Increasing absorbancy may be observed with increasing concentration of glucose, this relative increase in absorbancy is not significantly changed with increasing autoclaving time.

Summary and Conclusions

1. Absorbancy at 280 millimicrons was used as an indication of the amount of glucose decomposition products contained in an autoclaved glucose-sodium lactate solution.

2. Increasing time of autoclaving at 121°C. resulted in increasing absorbancy in all glucose-sodium lactate solutions.

3. Increasing concentrations of glucose resulted in increasing absorbancy with any given autoclaving time.

4. Increasing *p*H of sodium lactate resulted generally in increasing absorbancy with any given concentration of glucose and autoclaving time.

5. The stability of glucose-sodium lactate solutions might be improved by adjusting the *p*H of the sodium lactate solution to the lowest permissible value.

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Therapeutic Trends

edited by WILLIAM JOHNSON

Pharmacology of Hexahydro-1-Azepinepropionamidoxime Dihydrochloride (Su-4029)

Su-4029 has been studied for its effects on the cardiovascular system of the dog. Maxwell, Ross, and Plummer report in the *J. Pharmocol. Exp. Therap. 123*:128 (June) 1958 that a single dose of 30 mg./Kg. of body weight of this compound lowered the arterial pressure of neurogenic and renal hypertensive dogs while not notably effecting the blood pressure of normotensive dogs. Su-4029 in doses of 30 mg./Kg. given intravenously eliminated the severe hypertension brought on by doses of amphetamine and ephedrine and also markedly antagonized carotid occlusion reflex pressor responses. These antihypertensive effects were slow in onset and lasted for approximately 2 to 6 weeks following single injections. Su-4029 is neither adrenergic nor a ganglionic blocking agent. One site of action of Su-4029 is the sympathetic efferent periphery although this will not explain all the actions of this drug. Su-4029 produces marked sympathetic-like effects of rapid onset and relatively short duration. It is suggested that these effects may reflect the onset of the primary alterations which are responsible for the protracted antihypertension seen after administration of Su-4029.

R. H. HARRISON

A New Orally Effective, Long-Acting Ganglionic Blocking Agent For Hypertension, 189c56

The drug 189c56 appears to have several valuable features. Locket reports in the *Brit. Med. J.* page 74 (July 12) 1958 that this new drug is invariably effective when given by mouth. When daily doses are given before breakfast, it consistently produces the expected degree of hypotension. Duration of action makes it possible to control hypertension with one daily dose. Dosage is so critical that a variance of as little as 5 to 12 percent causes a marked effect on the extent and duration of the hypertension. Constipation is minimal or absent and disturbances of bladder-emptying do not occur. The drug was supplied by Burroughs Wellcome and Co.

R. H. HARRISON

Antibiotic E129 — Treatment of Boils

Several patients with severe boils were divided into three groups and each group was treated for one week. One group was given erythromycin 1 Gm. daily; the second group was given antibiotic E129 3 Gm. daily; and the third group was treated by local application of mercury perchloride. A report by Scott in *Brit. Med. J.* page 83 (July 12) 1958 presented results which showed that the antibiotic-treated groups recovered more rapidly and more satisfactorily than did the controls. The slight differences between the groups favored those which had been treated with antibiotic E129. All strains of staphylococci found in the patients were normally sensitive to both antibiotics. The strains were cultured again after one week's treatment and none had acquired resistance to either antibiotic. The material for this study was supplied by Glaxo Labs. Ltd.

R. H. HARRISON

Thrombolysis With Fibrinolysin (Plasmin)

Fifty-two patients with various forms of thromboembolic diseases were treated by intravenous infusions of a preparation of fibrinolysin in dosages up to 90,000 fibrinolytic units. Hemorrhagic complications have not occurred, and disturbances of the blood-coagulating factors were minimal as measured by prothrombin time, recalcification time, prothrombin content, proconvertin content, proaccelerin content and fibrinogen content. Fibrinolytic activity of the plasma was consistently enhanced by fibrinolysin infusion. The intensity and duration of such activity paralleled total fibrinolysin dosage. The toxicity of fibrinolysin appears limited to pyrogenicity which was encountered in 49.2 percent of the patients. The mechanism of this response has not been defined. Two instances of delayed allergic skin reactions were also noted. While fibrinolysin may prove to be a safe and effective agent for achieving acute lysis of an intravascular clot, firm conclusions regarding overall therapeutic value cannot be drawn from

this pilot study and must await completion of large-scale controlled studies. This report was presented by Kenneth Moser in *J. Am. Med. Assoc.* 167:165 (Aug. 2) 1958 and the fibrinolysin was supplied by the Ortho Research Foundation, Raritan, N. J. as Actase.

SYLVIA SCHMIDT

W-1191-2 — Short Term Diuretic

Amanozine (W-1191-2), a close analogue of chlorazanil, is found to be an orally administered non-mercurial triazine diuretic which causes only a slight augmentation of sodium excretion. Like chlorazanil, following chronic oral administration, laboratory evidence points out a significant but reversible depression of renal hemo-dynamics contemporary with nitrogen phosphate retention. The usefulness of 2-amino-4-anilino-1,3,5 triazine hydrochloride seems to be as a short term oral diuretic. David Miller and Ralph Ford in *Am. J. Med. Sci. 236*:32 (July) 1958 report further that the most effective dose of W-1191-2 is 150 to 300 mg. per 24 hours. The onset of action occurs two hours after administration, and the duration is between 12 and 18 hours. The mechanism of action of Amanozine differs from organo-mercurials, carbonic anhydrase inhibitors and chlorothiazide, suggesting yet a fourth mode of diuretic behavior. The material was furnished by the Department of Medicine and Pharmacology, Baylor University College of Medicine and V.A. Hospital, Houston, Texas

SYLVIA SCHMIDT

WIN-5211—Antitubercular Drug

During the screening of chemical compounds for antituberculous activity, Win-5211 exhibited a significant therapeutic effect with *M. tuberculosis* strain H37 Rv.-infected mice. Similar results were attained in mice and hamsters when using strains highly resistant to streptomycin and isoniazid. Experiments with infected hamsters indicated that 5-hexyl-2-thiohydantoin is significantly more effective than PAS and could be used effectively for multiple drug therapy at lower daily doses than PAS. Concurrent administration of this thiohydantoin derivative with dihydrostreptomycin as well as with isoniazid suppressed tuberculous infection in mice considerably more effectively than with each drug separately. The compound was well tolerated by laboratory rodents, dogs, and monkeys. The only side effect was a mild reversible hyperplasia of the thyroid gland which was observed upon prolonged medication in dogs and monkeys. The tolerance to Win-5211 was superior to PAS, and studies indicate this this compound might be a possible adjuvant to other chemotherapeutic agents in much the same manner as PAS. However, the response was not sufficient to justify its use as an alternative to isoniazid and dihydrostreptomycin. These findings were described by Ernest Froelick in *Am. Rev. Tuberc. 78*:74 (July) 1958. Win-5211 was furnished by Sterling-Winthrop Research Institute, Rensseleaer, N.Y.

SYLVIA SCHMIDT

Triethylenethiophosphoramide (TSPA)

Tumor S-91 is a moderately slow growing, pigmented, pleomorphic tumor that grows only in DBA mice and hybrid derivatives. TSPA, when administered after removal of a primary tumor, was shown to be effective in reducing the number of S-91 melanoma pulmonary metastases. This effectiveness is demonstrated despite the increased stimulus to growth of distant metastases. Metastases were completely prevented in some mice. Crystalline TSPA was dissolved in normal saline in a concentration of 0.1 percent shortly before intravenous administration. An experimental system is presented by which the effectiveness of chemotherapeutic agents can be ascertained under conditions that closely simulate clinical, postoperative situations in patients. The results of this study appear in *Cancer 11*:463 (May-June) 1958 and the material was supplied by the Lederle Laboratories.

W. E. HERSHBERGER

10 (N-Methylpiperidyl-3-Methyl) Phenothiazine

In comparison to other phenothiazine drugs, 10(N-methylpiperidyl-3-methyl) phenothiazine offers advantages in that it lacks any significant hypotensive action; it shows an inhibition and stabilization of the central and peripheral regulating mechanism of the autonomic nervous system; and direct depression of the central nervous system. A well balanced lytic effect on the sympathetic and parasympathetic divisions of the central nervous system, also marked ability to potentiate the action of hypnotic, anesthetic and analgesic drugs, and depressant action on the vomiting center are demonstrated. According to a report in *Southern Med. J. 51*:689 (June) 1958, 736 patients received the drug, alone or in combination with barbiturates and opiates, preoperatively. Only 6 operations were postponed or cancelled because of unsatisfactory preoperative conditions. No marked respiratory or circulatory depression preoperatively, during operation, or postoperatively is reported. The few patients who did develop hypotension responded promptly and effectively to vasoconstrictor drugs. Combination with barbiturates and opiates seems to increase the sedative and analgesic effects of this drug.

W. E. HERSHBERGER

Timely Drugs

Bonamine Elixir

GENERIC NAME: Meclizine (Bonamine).
INDICATIONS: For nausea and vomiting of pregnancy, motion sickness, labyrinthine and vestibular disturbances, cerebral arteriosclerosis, and radiation sickness.
SIDE EFFECTS AND CONTRAINDICATIONS: Drowsiness, blurred vision, dry mouth, and fatigue are occasionally seen.
DOSAGE: Adults, 25 to 50 mg.; children, 6 to 12, ½ adult dose; children under 6, in proportion to body weight, as determined by physician.
PREPARATIONS: Cherry-flavored liquid containing meclizine equivalent to 12.5 mg. per 5 ml.
PACKAGING: Bottles of 16 ounces.
SUPPLIER: Pfizer Laboratories.

Cerumenex

COMPOSITION: Triethanolamine polypeptide oleate-condensate (Cerapon) in propylene glycol.
INDICATIONS: Cerumenolytic agent for easy, safe and painless removal of earwax; for cleansing prior to ear examination, removing excess or impacted cerumen, and pretreatment removal of cerumen.
DOSAGE: Fill ear canal with Cerumenex, insert cotton plug and allow to remain overnight; gently flush or wash ear with soft rubber ear syringe.
PREPARATIONS: Solution containing 10% Cerapon in propylene glycol with 0.5% chlorobutanol.
PACKAGING: Bottles of 15 ml. with blunt-end ear dropper.
SUPPLIER: Purdue Frederick Co.

Clarin

GENERIC NAME: Heparin potassium.
INDICATIONS: For management of hyperlipemia associated with atherosclerosis, especially in post-coronary patients and those with early signs of coronary artery disease.
DOSAGE: 1,500 international units, held under tongue until dissolved, after each meal.
PREPARATION: Tablets containing 1,500 international units of heparin potassium.
PACKAGING: Bottles of 50 tablets.
SUPPLIER: Thos. Leeming & Co., Inc.

Daranide

GENERIC NAME: Dichlorphenamide.
INDICATIONS: Orally effective carbonic anhydrase inhibitor; lowers intraocular pressure by inhibiting formation of aqueous humor in normal as well as glaucomatous eyes. For treatment of chronic simple (wide angle) glaucoma, acute congestive (narrow angle) glaucoma, chronic congestive glaucoma, secondary glaucoma (acute phase), preoperative control of intraocular tension of glaucoma.
DOSAGE: Adults, 25 to 50 mg. once to 3 or 4 times daily.
PREPARATIONS: Tablets of 50 mg.
PACKAGING: Bottles of 100 and 1,000 tablets.
SUPPLIER: Merck Sharp & Dohme.

Dextran 12% Solution

COMPOSITION: Partially hydrolyzed dextran in a salt-free and pyrogen-free sterile solution.
INDICATIONS: For relief of edema in nephrosis.
SIDE EFFECTS AND CONTRAINDICATIONS: In patients with heart disease or impaired kidney function, early signs of pulmonary edema or congestive heart failure should be watched for; occasionally, mild urticaria may develop.
DOSAGE: Daily infusion of 300 to 400 ml. per square meter of body surface, or 10 to 15 ml. per Kg. of body weight, at a rate of 2 to 4 ml. per minute.
PREPARATIONS: Sterile solution for intravenous use containing 12% dextran.
PACKAGING: Abbo-liters of 250 ml.
SUPPLIER: Abbott Laboratories.

Glycine Injection

CHEMICAL NAME: Glycine; aminoacetic acid; glycocoll.
INDICATIONS: Nontoxic, nonhemolyzing urologic irrigating solution for use after dilution, to avoid the complication of hemoglobinemia and hemoglobinuria following transurethral resection.
CAUTION: Must be diluted before use.
DOSAGE: The contents of one 1,000 ml. bottle of 15% glycine is diluted with nine liters of sterile, nonpyrogenic, distilled water to yield a 1.5% solution for use as an irrigating fluid.
PREPARATIONS: Concentrated solution of glycine 15% in water.
PACKAGING: Bottles of 1,000 ml., *to be diluted before use.*
SUPPLIER: Baxter Laboratories, Inc.

Isophyllin

COMPOSITION: Isoproterenol, racephedrine hydrochloride, phenobarbital, and dihydroxypropyl theophylline (Neothylline).
INDICATIONS: Continuous control of bronchospasm in chronic asthma; tablet contains outer core of isoproterenol for immediate action, inner core containing other ingredients for longer sustained action.
DOSAGE: One tablet every 4 hours for continuous control of bronchospasm; one tablet taken sublingually for sudden attack.
PREPARATIONS: Tablets containing isoproterenol 10 mg., racephedrine hydrochloride 16 mg., phenobarbital 8 mg., and dihydroxypropyl theophylline 130 mg.
PACKAGING: Bottles of 100 and 1,000 tablets.
SUPPLIER: Paul Maney Laboratories.

Meti-Derm Aerosol

GENERIC NAME: Prednisolone.
INDICATIONS: For topical use in dermatitis conditions which respond to steroid therapy.
CAUTION: Meti-Derm Aerosol should not be sprayed around the eyes; contents of can are not flammable but are under pressure; container should be stored in cool place, and not punctured or incinerated.
DOSAGE: Container should be shaken before use and held

in upright position during use; spray should be directed on affected area from a distance of 3 to 6 inches for 2 or 3 seconds; should be applied 3 or 4 times daily.

PREPARATIONS: 150 Gm. spray can containing 50 mg. of prednisolone; a 3-second spray delivers approximately 0.5 mg., an amount sufficient to cover an area about the size of the hand.

SUPPLIER: Schering Corp.

Nitrillin

COMPOSITION: Glyceryl trinitrate, pentaerythritol tetranitrate, and dyphylline (Neothylline).

INDICATIONS: For management of angina pectoris, coronary insufficiency with angina, coronary spasm with myocardial pain, hypertension with angina, and anginal syndrome. Contains glyceryl trinitrate in outer (sublingual), flavored coating, to be swallowed for longer action when flavor disappears.

SIDE EFFECTS AND CONTRAINDICATIONS: Headache may occur in small percentage of patients; caution should be exercised in glaucoma, increased intracranial pressure, and nitrate idiosyncrasy.

DOSAGE: Acute attack, one tablet held sublingually then swallowed; maintenance dosage, 2 to 4 tablets daily, swallowed whole.

PREPARATIONS: Tablets containing glyceryl trinitrate 0.4 mg., pentaerythritol tetranitrate 15 mg., and dyphylline 100 mg.

PACKAGING: Bottles of 100 and 1,000 tablets.

SUPPLIER: Paul Maney Laboratories, Inc.

Ora-Testryl

GENERIC NAME: Fluoxymesterone.

INDICATIONS: May be administered for anabolic effects in protein depletion states, in osteoporosis, resistant fractures and panhypopituitarism; in females, for treatment of menorrhagia and metrorrhagia, and for palliation of advanced inoperable carcinoma of the breast; in males, for primary and secondary hypogonadism, delayed puberty, eunuchism, and male climacteric.

SIDE EFFECTS AND CONTRAINDICATIONS: Should be used with caution in young boys; hypercalcemia may occur and therapy should be discontinued; contraindicated in patients with prostatic carcinoma; should not be used during the first trimester of pregnancy.

DOSAGE: Individually determined, varying from 2 to 10 mg. daily.

PREPARATIONS: Tablets of 2 mg. and 5 mg. scored.

PACKAGING: 2 mg., bottles of 100 tablets; 5 mg., bottles of 50 tablets.

SUPPLIER: E. R. Squibb & Sons.

Polykol Drops

CHEMICAL NAME: Oxyethylene oxypropylene polymer.

INDICATIONS: For prevention and treatment of constipation associated with hard, dry stools. Wetting action of oxyethylene oxypropylene polymer brings about penetration of stool with water, causing it to become soft and easily eliminated. Nontoxic and may be used indefinitely.

DOSAGE: Children 3 to 12 years of age, 0.2 Gm. (1 ml.) 1 to 3 times daily; infants and children under 3, 0.1 to 0.2 Gm. (½ to 1 ml.) 1 or 2 times daily.

PREPARATIONS: Flavored solution containing oxyethylene oxypropylene polymer (Polykol) 0.2 Gm. per ml.

PACKAGING: Bottles of 30 ml. with dropper graduated for ½ and 1 ml.

SUPPLIER: Upjohn Co.

Protef

COMPOSITION: Hydrocortisone (Cortef) acetate and neomycin sulfate.

INDICATIONS: Anal fissure, postoperative edema, radiation proctitis, cryptitis, papillitis, nonspecific localized proctitis, anusitis, mechanical trauma, irritation, postoperative treatment of distulectomy, and hemorrhoidectomy.

SIDE EFFECTS AND CONTRAINDICATIONS: Should be used with caution in patients already receiving corticosteroid therapy orally or parenterally, as 20 to 40 percent of rectally administered hydrocortisone may be absorbed; should not be used for longer than 4 to 7 days.

DOSAGE: Cleanse affected area with water, remove foil wrapper, moisten suppository with water and insert gently; may be repeated 2 to 4 times daily.

PREPARATIONS: Suppositories containing hydrocortisone acetate 15 mg. and neomycin sulfate 15 mg. (equivalent to 10.5 mg. neomycin base).

PACKAGING: Boxes of 12 foil-wrapped suppositories.

SUPPLIER: Upjohn Co.

R-gene

CHEMICAL NAME: 1-Arginine monohydrochloride.

INDICATIONS: To reduce blood ammonia levels in hepatic coma or impending hepatic coma, in ammonia intoxication due to ingestion of ammonium salts, in acute hepatic insufficiency due to viral hepatitis or hepatotoxins, in portal cirrhosis associated with increase of nitrogenous material in intestine, following massive upper gastrointestinal hemorrhage.

PRECAUTIONS: For maximum clinical response, measures to reduce ammonia intake should also be started, such as reduction or complete withdrawal of protein intake, control of gastrointestinal bleeding, prompt removal of blood from intestine by lavage or enema, large doses of neomycin to reduce ammonia production in the intestine.

DOSAGE: Initially, 500 ml. intravenously over a period of 1 to 3 hours; depending on clinical response and blood ammonia levels, additional 500 ml. may be administered every 8 to 12 hours for a period as long as 72 hours.

PREPARATIONS: 1-Arginine monohydrochloride 5% in nonpyrogenic distilled water.

PACKAGING: Unit consisting of bottle of 400 ml. of 5% arginine, 100 ml. of 5% dextrose, a double-ended needle, airway needle, and administration set.

SUPPLIER: Cutter Laboratories.

Sterotril

COMPOSITION: Prednisone (Meticorten) and perphenazine (Trilafon).

INDICATIONS: Rheumatoid arthritis, fibrositis, bursitis, and other anxiety-complicated rheumatic disorders; allergic conditions resistant to conventional therapy or those in which tension has resulted in exacerbation of symptoms; as low-dosage maintenance therapy in collagen diseases such as disseminated lupus erythematosus, scleroderma, etc.

SIDE EFFECTS AND CONTRAINDICATIONS: Same as those that apply to corticosteroids and phenothiazines when administered separately.

DOSAGE: For acute conditions or initial suppressive therapy, 2 tablets 3 or 4 times daily; maintenance dosage, for patients not requiring more than 10 mg. prednisone for initial therapy, 1 tablet 4 times daily.

PREPARATIONS: Tablets containing 2.5 mg. prednisone and 2 mg. perphenazine.

PACKAGING: Bottles of 30 and 100 tablets.

SUPPLIER: Schering Corp.

notes + suggestions

edited by CLIFTON J. LATIOLAIS

HEATING JACKETS

A new line of improved laboratory heating jackets is available through lab supply houses. These are known as Briskeat Laboratory Heating Jackets. These heating elements are available in various types and sizes for use with funnels, beakers, Erlenmeyer flasks, 5-gallon carboys, and drums. These heating jackets are thermostatically controlled and may be allowed to operate at a temperature up to 450°C.

OINTMENT FOR TREATING HYDROFLUORIC ACID BURNS

The following formula for treatment of hydrofluoric acid burns was reported in *Glycerin Facts*, April 15, 1958.

Glycerin	18.0%
Procaine Hydrochloride	1.2%
Magnesium Sulfate Heptahydrate	20.0%
Magnesium Oxide	6.0%
Water Soluble Base	54.8%
	100.0%

WATER WHITE SHAMPOO

Sodium Lauryl Ether Sulfate (Sipon ES)*	20.0%
Sodium Lauryl Sulfate	20.0%
Polyethylene Glycol 400 Monostearate	1.5%
Lauric diethanolamide (90%)	3.0%
Siponic L3*	2.5%
Propylene Glycol	4.0%
Water	49.0%
	100.0%

Mix the Sipon ES, sodium lauryl sulfate, Siponic L3, propylene glycol, and water and heat to 70°C. Then melt the lauric diethanolamide and polyethylene glycol 400 monostearate together and add to the first mixture. Stir constantly until clear and cool to 40°C. before adding perfume (if desired).

This formula was developed by the American Alcolac Corporation, Baltimore, Md.

*Sipon ES and Siponic L3 are products of American Alcolac Corp.

PINE OIL CLEANER (LIQUID)

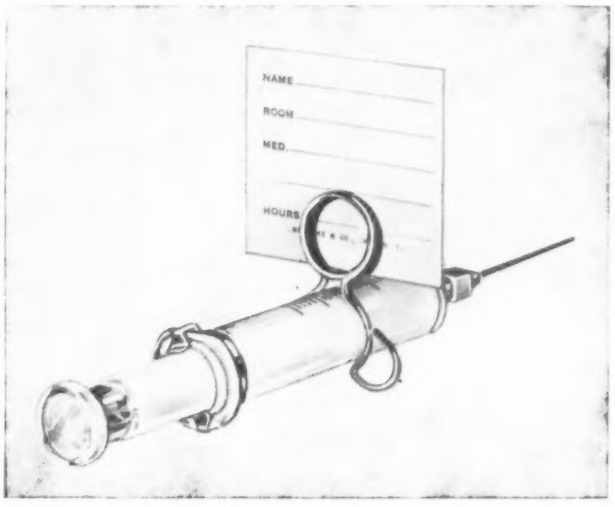
Renex 20 or Renex 30*	10.0%
Pine Oil	2.5 to 5.0%
Carboxymethylcellulose	0.5%
Water, to make	100.0%

Dissolve the CMC in warm water first, then add the Renex, stirring thoroughly. Then add the pine oil with mild agitation. (*Chemmunique*, 6:1, Jan-Feb. 1958.)

*Polyoxyethylene derivatives—Atlas Powder Co., Wilmington, Del.

SYRINGE CARD CLIP

This illustrated syringe card clip* is designed to hold the medication card securely to the syringe to



insure positive medication identification. The clip is brass plated and fits 2 ml. or 5 ml. syringes interchangeably. Current prices are $2.60 per dozen in small quantities, $2.40 per dozen in gross lots.

*Available from Meinecke and Co., Inc., 225 Varick Street, New York 14, N. Y.

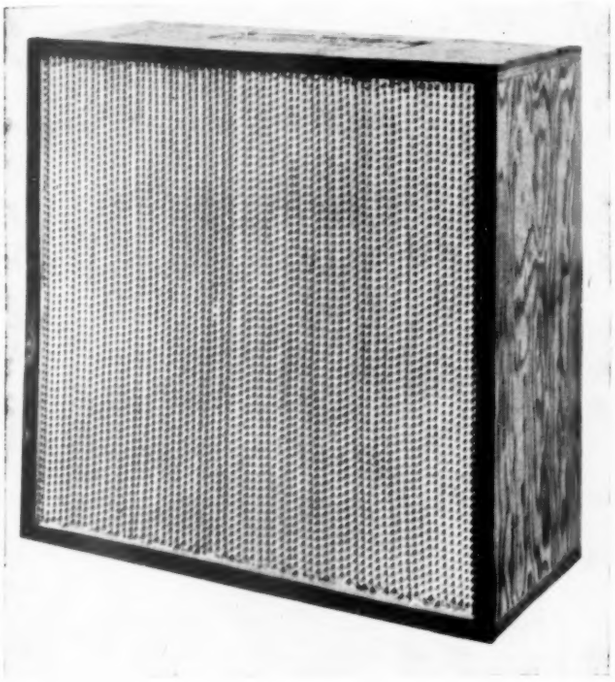
SAFFLOWER OIL EMULSION (O/W)

Safflower Oil	65.00%
Sorbitan Monostearate (Span 60)	1.25%
Polysorbate 80, USP (Tween 80)	3.75%
Sorbitol Solution, N.F.	10.00%
Sorbic Acid	0.2 %
Distilled Water, to make	100.00%

Heat the safflower oil, Span 60, and Tween 80 to 60°C. Heat the sorbitol solution, sorbic acid, and water to 62°C. Add the oil-emulsifier mixture to the aqueous mixture and homogenize. (*Chemmunique*, 6:10, Mar.-Apr. 1958.)

AIR FILTER FOR STERILE ROOMS

The new Absolute* Filter Medium consists of a combination of selected glass and asbestos fibers. The company claims the filter provides minimum efficiency



of 99.97% based on removal of 0.3 micron diameter particles. The 24" x 24" x 11½" filter provides over 200 square feet of filter media. This filter is particularly adaptable for filtering air supplied to sterile areas.

*Available from Cambridge Filter Corp., 738 Erie Blvd. East, Syracuse 3, N. Y.

PRESSURE SENSITIVE ADHESIVE

Polyvinyl Acetate Emulsion	55.6 Gms.
Pycal 94	19.4 Gms.
Water	25.0 Gms.
	100.0 Gms.

Mix Pycal 94 and water and then add slowly to the polyvinyl acetate with rapid agitation.

This formulation applied to paper or cloth produces a permanently tacky film with excellent cohesive properties. This is one of the formulas suggested by Atlas Powder Company in the 19-page brochure entitled "Pycal 94."

DUPONOL XL FOR SHAMPOO FORMULATION

A 5-page information bulletin on Duponol XL is available from E. I. Dupont de Nemours and Company, Wilmington, Del. Duponal XL is a new anionic-amphoteric product especially developed for shampoos. A number of suggested shampoo formulations are included in the brochure.

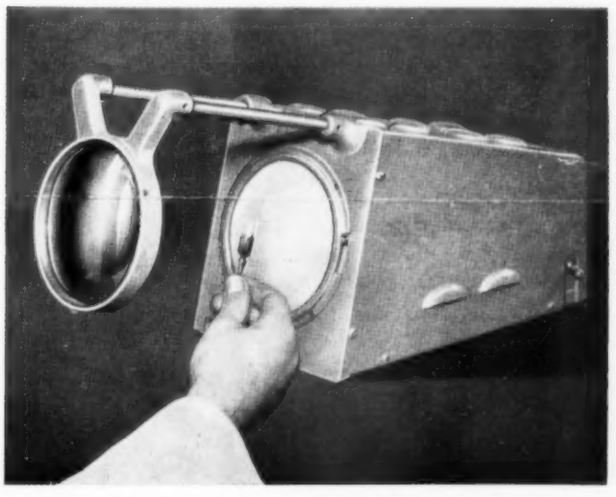
OINTMENT TUBE BOOKLET

The Wirz Tube Handbook* includes a chart which shows the recommended tube metals for packaging various types of products. Other information includes specifications on applicator tips, closures, caps, and cap liners. A reference chart indicates the capacity of ointment tubes in fluid ounces and in milliliters with the diameter and length in inches of available tubes.

*Available from A. H. Wirz, Inc., 4th and Townsend Sts., Chester, Pa.

AMPUL VIEWER

Minute particles of foreign matter in the contents of ampuls and vials are easily detected with the aid of the Ampoule Viewer EDM 208*. This viewer has a five-inch diameter lens with a 2x magnification

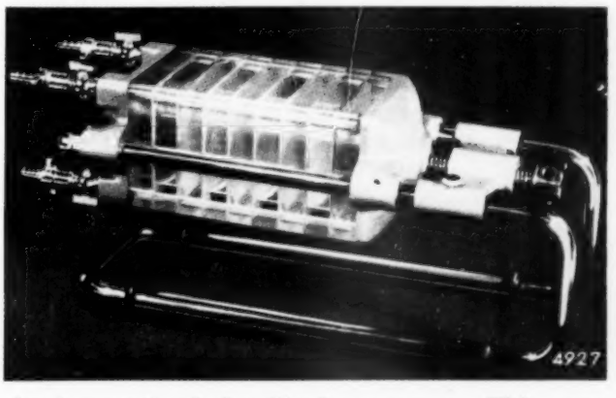


power. The lens has a good depth of focus and positioning of ampuls is not critical. It is optically corrected for binocular viewing. Overall size is 20" x 7" x 10½" high. $139.50 FOB, Newport, R. I.

*Engineering Developments, Inc., P. O. Box 149, Newport, R. I.

PLEXIGLAS LABORATORY FILTER PRESS

A special laboratory filter press,* fitted with Plexiglass frames and plates, is available to provide for



visual control of the filtering process. This press uses 5-inch filter plates.

*Available from F. H. Schule Ltd., Hamburg 26, Germany.

Consulting WITH BOWLES

GROVER C. BOWLES JR., *Baptist Memorial Hospital, Memphis, Tennessee*

► We are considering the publication of a newsletter for distribution to the nursing service. Should it contain information other than on new drugs? How often should a newsletter be published?

Information on new drugs usually accounts for the major portion of a pharmacy newsletter. Other helpful information presented under such headings as: "Helpful Suggestions," "Different in Name Only," and "Of Special Interest" add to the readability and usefulness of the newsletter.

Publication of the newsletter regularly on a monthly basis is adequate to keep the nursing staff informed on the advances in drug therapy and other mutual problems.

► I am interested in the cultivation of drug plants as a hobby. Where can I find information about drug plants other than the standard textbooks on pharmacognosy?

Three bulletins relating to the growth of drug and condiment plants published by the United States Department of Agriculture are available from the Superintendent of Documents, Government Printing Office, Washington 25, D. C. They are: (1) American Medical Plants of Commercial Importance—Miscellaneous Publication No. 77, (2) Production of Drug and Condiment Plants—Farmers Bulletin No. 1999, and (3) Savory Herbs—Culture and Use—Farmers Bulletin No. 1977. These publications are inexpensive and contain much interesting information about the cultivation of medicinal plants in this country.

Another book, Garden Spice and Wild Pot-Herbs by Muenscher and Rice with woodcuts by Abbe published by Comstock Publishing Associates, 124 Roberts Place, Ithaca, New York, is a source of helpful and unusual information about herbs. The comments about the medicinal properties of plants and the hints about their use in cookery will be of particular interest to the pharmacist.

► Some time ago I heard that the SOCIETY was developing a Formulary Service for hospitals. We need a formulary for our hospital and I am wondering whether the SOCIETY'S service will be available relatively soon.

The American Hospital Formulary Service is now in press and will be available late this year. The cost and other details of the Service were announced in an article entitled "The American Hospital Formulary Service—Its Application and Use," and published in the June issue of this JOURNAL.

Reprints of the article are available by writing to either Gloria Francke, Secretary, AMERICAN SOCIETY OF HOSPITAL PHARMACISTS, 1020 Ferdon Road, Ann Arbor, Michigan, or to Paul Parker, Director, Division of Hospital Pharmacy, American Pharmaceutical Association, 2215 Constitution Avenue, N. W., Washington 7, D. C.

Orders for the Service are being received by the AMERICAN SOCIETY OF HOSPITAL PHARMACISTS, Hamilton Press, Hamilton, Illinois.

► In the March issue of the AMERICAN JOURNAL OF HOSPITAL PHARMACY there were several summaries of articles in the "Selected Pharmaceutical Abstracts" section from the BULLETIN OF THE PARENTERAL DRUG ASSOCIATION. We would like to know where this bulletin can be obtained or at least to have the address of the publisher. Can you supply this information for us?

The *Bulletin of the Parenteral Drug Association* is published quarterly and is sent to all members of the Association. No subscriptions are accepted from non-members. University and public libraries may subscribe at $10.00 per year. For an application form and information regarding qualifications and classifications, address the Parenteral Drug Association, 130 East 59th St., New York 22, N.Y.

► What is the recommended floor space for a hospital pharmacy department?

Several years ago "Suggested Plans for Hospital Pharmacies—50, 100, and 200 Bed General Hospitals" were made available through the Division of Hospital Facilities of the U. S. Public Health Service and published in THE BULLETIN OF THE AMERICAN SOCIETY OF HOSPITAL PHARMACISTS (May-June) 1950. According to these plans, approximately five square feet per bed was suggested, this varying according to bed size. Also, this figure did not cover storage.

More recently a study has been made by a special Committee on Research and Planning of the Guild of Public Pharmacists of England. According to this study, the minimum area recommended for a pharmaceutical department in a general hospital is 8.5 square feet/bed for 100 beds; 7.3 square feet/bed for 300 beds and 7.5 square feet/bed for 600 beds. This includes the dispensary, the aseptic department, stores and office.

as the president sees it—

ROBERT C. BOGASH, *Lenox Hill Hospital, New York City*

► IN THE REALM OF PERSONAL MEMORABILIA, the Toronto Institute in 1952 remains one of the finest I have attended. So pleasant is its residual image that any personal reflection on Institutes' projects brings this one to the fore. The reason for which is easily recalled—it had an excellent formula. The subject matter was meaty and pertinent, the format was integrated, the physical surroundings of the University of Toronto were conducive to such a session and most noteworthy of all, our hosts were gracious.

The past few years must have dimmed somewhat the memory of just how warm and wholesome our Canadian confreres were on that occasion. The recent Canadian Institute on Hospital Pharmacy restored the clarity of my original impression. Conducted in the impressive confines of the University of Alberta, in the now oil rich city of Edmonton, the Institute was a productive three day session. The program contained subjects not unlike any of our own. This is conceivable since in any country with a well organized health department, the problems of hospital pharmacy cannot be too dissimilar from those that we sometimes believe are our exclusive property. So too with the practitioners, the Ed Smiths, Marie Gannons, The Richardsons, Walter Madays, Glen Moirs, and the good Sisters Felicitas and Fischer. So it was, the Canadian Institute, its practitioners, problems and anxieties, all composite parts of the progressive movement to upgrade pharmacy service in hospitals.

What is heartening to notice of organized hospital pharmacy is its self imposed vigilance. Its constant self criticism and analysis. Such objectivity is vital to a growing organization. We should be thankful that we have initiated and accepted this internal discipline of quality control! A quick glance and personal curbstone opinion of both American and Canadian hospital pharmacy bodes well for pharmacy practice in hospitals and for continued finer service to the patients who occupy our beds and visit our clinics.

Sandwiched between the Canadian Institute and the American Hospital Association's Annual Meeting was the Policy Committee Meeting of the Division of Hospital Pharmacy, A.Ph.A. and the ASHP. The first such meeting in two years, there were discussed several important issues. Candidly, to me the most important issue concerned internship accreditation. Briefly, there was put into motion a method to quickly, yet equitably, judge the depth, scope and quality of current internship programs. This represents a real accomplishment. We are all aware we are obligated to provide an intern with the assurance that he will receive as much education and practical experience as is available in the hospital of his choice. Personally, I maintain it is now propitious to evaluate what we have done, are doing, and what we desire to achieve in this important area. Both student and mentor, as well as the profession generally, could be afforded no better insurance than a policy of quality control. Specifically, "in process control" which could be effectuated through honest, objective accreditation.

Last year, past-President Leo Godley, the SOCIETY's recent contribution to Texas, established liaison with the National League for Nursing. The general framework of this contact was to explore areas where possibly the National League for Nursing and the ASHP might mutually work to effect better patient care, with particular reference to the dispensation and administration of medications. Distance and organizational commitments mitigated against a joint meeting during the year. The greatest impediment, distance, has been resolved since New York is my bailiwick too. Recently Norman Baker and Gene Frank, President and Program Chairman, respectively, of the Southeastern New York State Chapter and I invited Miss Griffin to attend our first meeting of the year. Miss Griffin not only accepted but graciously consented to participate in a panel discussion concerned with Medication Accidents. The panelists and audience, composed of pharmacists, nurses and medical service representatives, contributed greatly to make a successful meeting. There was exchanged a wealth of information as well as many illustrations of conditions that predispose to accidents. It was an excellent "kick off" meeting and Miss Griffin and I parted in warm accord that we meet again in several weeks to arrange a joint NLN-ASHP meeting.

Robert C. Bogash—

SELECTED PHARMACEUTICAL ABSTRACTS

and summaries of other articles interesting to hospital pharmacists

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edited by CLIFTON J. LATIOLAIS *and* LEO F. GODLEY

ASPIRIN, SOLUBILITY IN TABLETS

Factors Concerning the Solubility of Acetylsalicylic Acid in Tablets, Langerwall, Tord and Ostholm, Ivan, Farmacevtisk Revy 55:739 (1956).

Different qualities of acetylsalicylic acid show a considerable variation in their water-solubility. Coarse crystals dissolve slower and more incompletely than those of fine crystals or powder.

Neutralizing agents increase the water-solubility of acetylsalicylic acid in tablets. Calcium carbonate is more effective in increasing the solubility of acetylsalicylic acid than magnesium oxide, whereas sodium lauryl sulfate is more effective than either calcium carbonate or magnesium oxide.

OTMAR NETZER

INJECTIONS, HYDROGEN SULFITE AS STABILIZER IN

Critical Consideration of the Use of Hydrogen Sulfite as a Stabilizer for Injections, Bamann, E., Schriever, K., and Toussaint, R., Deutsche Apotheker-Zeitung 98:384 (Apr. 24) 1958.

This special study was made to determine the effect of sodium hydrogen sulfite (sodium pyrosulfite) used by various pharmacopeias as a stabilizer and antioxidant in injectable solutions of anthranilic acid, morphine, epinephrine, p-oxy-phenylmethylamino propanol HCl (suprifen), and procaine.

Numerous tests were carried out with aqueous, 0.01 molar solutions of the above mentioned drugs containing 0%, 0.1% or 1.0% sodium pyrosulfite. The freshly prepared distilled water was saturated with a stream of nitrogen gas for one hour. The solutions were assayed immediately after preparation and were also filled into 12.5 ml. clear ampuls containing 5 ml. and 10 ml. quantities, immediately closed and stored in a dark place for 6 to 12 months. Then the ampuls were assayed again. Assay procedures were carried out by the spectrophotometric and reduction methods (phosphormolybdenum blue in combination with a light electrical colorimeter, except for procaine solutions).

Results show that, upon assay of the stored ampuls, a hydrogen sulfite oxygen reaction occurred which caused a hydroxylization of the drugs. (For example, procaine solutions containing sodium bisulfite as a stabilizer result in the formation of hydroxy-procaine.) The drug concentration of the solutions decreased and also contained new chemical compositions with unknown or undesirable pharmacologic action. Addition of hydrogen sulfite does not prevent decomposition or color change of the solutions. The change in color is not immediately perceptible to the human eye since the hydrogen sulfite may transfer the forming dye into its leuco form.

Therefore, the authors reject the use of hydrogen sulfite as a stabilizer in solutions for injection.

OTMAR NETZER
(School of Pharmacy and Food Chemistry, University of Munich)

DISINFECTANTS, EVALUATION OF

Bactericide / Leukocide Ratio: A Technique for the Evaluation of Disinfectants, Greenberg, Leo and Ingalls, J. W., J. Am. Pharm. Assoc., Sci. Ed., 47:531 (July) 1958.

The purposes of this study were to develop a simplified method for the determination of chemical toxicity to leucocytes which might routinely be used by small laboratories for the evaluation of wound disinfectants and to determine, through the use of such a technique, the bactericidal and leukocidal values of some of the most commonly used wound disinfectants.

Fifteen commercially available disinfectants were used in the study. The concentrations reported were the highest determined concentrations in which growth was obtained. Comparing the germicidal efficiency of the pure compounds, the ones ranking highest were tincture of Zephiran, tincture of iodine, and tincture of Merthiolate. Comparing the effectiveness of the most commonly used strengths of each of the disinfectants, Lysol, Clorox and gentian violet were most germicidal, followed closely by tincture of iodine, Isodine and tincture of Zephiran—in that order.

Final results are tabulated in the form of bactericidal / leukocidal ratio of each of the compounds tested. This ratio is a toxicity index; therefore, the lower the ratio, the safer the compound for routine use as a wound disinfectant. The results indicated that only gentian violet, Clorox, and Isodine are less toxic to white blood cells than to bacteria.

The authors conclude with a discussion of the limitations on the use and significance of the test procedure reported.

WARREN E. MCCONNELL

SULFADIAZINE SODIUM INJECTION, STABILITY OF

Study of Stability of Sulfadiazine Sodium Injection III. An Investigation of Degradation Products of Sulfadiazine Sodium, Swartz, C. J. and Autian, John, J. Am. Pharm. Assoc., Sci. Ed., 47:490 (July) 1958.

This study was undertaken in an attempt to disclose the nature of the coloration and precipitation which occurs in solutions of sodium sulfadiazine on prolonged storage. Infrared and ultraviolet spectra of the precipitate from a sodium sulfadiazine solution differed little from the spectra of pure sulfadiazine. The spectrophotometric evidence indicated that the precipitate is composed of at least 99% sulfadiazine.

The colored fraction of an aged sodium sulfadiazine solution was isolated, using a Soxhlet extractor. The product finally isolated was a yellow-colored oil, the infrared spectrum of which indicated that it consists of intermediate oxidation products which were postulated to be sulfanilic type compounds which undergo further oxidation to colored compounds with a quinoid structure.

The analytical procedures demonstrated that degradation of the sulfadiazine sodium in ampuls stored at 60° for 100 days was less than 2% in all quantitative procedures employed.

WARREN E. MCCONNELL

TABLET DISINTEGRANT, AMBERLITE RESIN XE-88

Amberlite Resin XE-88, as a Tablet Disintegrant, Van Abbe, N. J. and Rees, J. T., J. Am. Pharm. Assoc., Sci. Ed., 47:487 (July) 1958.

Using two standard tablet granulations, one containing calcium phosphate, moist and granulated with gelatinized 6% starch paste, and the other containing phenobarbital and lactose, granulated with 10% gelatin mucilage, the effects of different concentrations of Amberlite XE-88 as a tablet disintegrant were studied.

Results showed that the inclusion of 5 to 15% of Amberlite resin yielded tablets having acceptable disintegration times and of adequate mechanical strength. The resin was also very effective in the presence of high concentrations of magnesium stearate as a lubricating agent. There was no significant effect upon the appearance, odor, or taste of the tablets either initially or after storage and prolonged storage had no effect upon disintegration time. The requisite amounts of resin did not unduly increase tablet size.

It appeared that Amberlite XE-88 was effective in a lower concentration that corn starch and the fact that it maintained its efficiency in the presence of high concentrations of hydrophobic lubricant suggests that it might be particularly useful in granulations having a severe tendency to adhere to the punches and dies of tablet compressors.

WARREN E. MCCONNELL

PERFUME OILS, ANTIMICROBIAL ACTIVITY OF

The Antimicrobial Activity of Perfume Oils, Maruzzella, J. C. and Henry, P. A., J. Am. Pharm. Assoc., Sci. Ed., 47:471 (July) 1958.

The antimicrobial activity of 100 perfume oils was tested against growing cultures of ten bacteria and ten fungi with an *in vitro* filter paper disk method. All of the zones of inhibition were tested to ascertain whether the activity was microbicidal or microbistatic.

Results showed that all the oils had antimicrobial activity on at least two of the ten bacteria used and at least six of the ten fungi employed. *Pseudomonas aeruginosa* was found to be the most resistant bacteria while *Candida krusei* was the most resistant fungus. More than 70% of the perfume oils had microbicidal activity. There did not appear to be any direct correlation between antifungal and antibacterial activity of the perfume oils. It was concluded that fungi are almost twice as vulnerable to perfume oils as bacteria.

WARREN E. MCCONNELL

SODIUM ALGINATE SOLUTIONS, VISCOSITY CHANGES DUE TO CALCIUM

The Role of Residual Calcium in the Viscosity Changes of Sodium Alginate Solutions, Levy, Gerhard and Schwarz, T. W., J. Am. Pharm. Assoc., Sci. Ed., 47:455 (June) 1958.

It has been noted that solutions of a type of sodium alginate exhibit a marked viscosity increase after freezing and thawing. This behavior, which is apparent in most commercial types of sodium alginate, was found to be absent in highly purified material which had a very low calcium content. This report presents the results of an investigation of the role of residual calcium in the viscosity changes of sodium alginate solutions, especially after freezing and thawing.

It was found that the viscosity increase of sodium alginate solutions, after freezing and thawing, is proportional to the amount of calcium originally present.

The addition of increasing amounts of ethylenediamine tetraacetic acid to solutions of sodium alginate showed that solutions of sodium alginate below a minimal concentration of unsequestered calcium undergo no viscosity increase due to freezing, and that EDTA can be used to prevent such viscosity changes of sodium alginate solutions containing more than the minimal amount of residual calcium. The addition of sodium citrate or sodium hexametaphosphate instead of EDTA produced the same effect.

Additional experiments are described, all of which lead the authors to conclude that, in effect, the viscosity of sodium alginate solutions is directly related to the amount of calcium alginate present in the solution. The greater viscosity of calcium alginate is attributed to greater cross-linkage between the alginate molecules.

WARREN E. MCCONNELL

TRAGACANTH SOLS, VISCOSITY OF

Tragacanth Solutions 1. The Relation of Method of Preparation to the Viscosity and Stability, Levy, Gerhard and Schwarz, T. W., J. Am. Pharm. Assoc., Sci. Ed., 47:451 (June) 1958.

In spite of its wide application as a dispersion stabilizer and thickening agent, tragacanth gels present the problem of uncertain viscosity stability. The method of preparation, the pH, and the storage temperature are all claimed to influence the viscosity of tragacanth solutions. Two processes, hydration and degradation, which occur simultaneously during aging, result in viscosity changes which are difficult to predict. Slow and continuous hydration causes a gradual increase in viscosity while simultaneous degradation of tragacanth has the opposite effect. The over-all effect after an extended storage period is a decrease in viscosity since degradation will continue atfer hydration of the gum is complete.

The study reported was undertaken to attempt the evaluation of the factors contributing to the hydration as well as to the degradation of tragacanth in aqueous solution. The investigation aimed at developing a method for obtaining maximum hydration of tragacanth with little or no simultaneous degradation. Two main approaches were followed: homogenization (mechanical treatment) and application of heat. Accelerated aging tests were also carried out on the tragacanth solutions prepared by different methods in order to obtain further knowledge about the effect of such procedures on the long-term viscosity changes of the gum.

Repeated homogenization of 1.5% tragacanth solutions, using both a piston-type hand homogenizer and a colloid mill, caused the viscosity to increase to a point where further homogenization had little or no effect. The initial anomalous effects of hand homogenization on the solutions are described. Tragacanth solutions prepared by boiling for different periods of time were repeatedly homogenized and subjected to viscosity determinations. It was found that those solutions which had been subjected the longest to boiling temperatures had the lowest maximum viscosity after repeated homogenization.

The aging of homogenized and non-homogenized solutions showed that the former underwent a continuous decrease in viscosity while the latter underwent a continuous increase in viscosity up to about 31 days. The authors suggest that, by combining given proportions of homogenized and non-homogenized tragacanth solutions, it is possible to produce a tragacanth dispersion which will maintain a fairly uniform viscosity over a period of 4 or 5 weeks.

WARREN E. MCCONNELL

CARBOPOL 934 STABILITY

A Report on the Oxidative Degradation of Neutralized Carbopol, Schwarz, T. W. and Levy, Gerhard, J. Am. Pharm. Assoc., Sci. Ed., 47:442 (June) 1958.

Observing that gels, stabilized with Carbopol 934, undergo a marked viscosity decrease at room temperature within two or three weeks if they are exposed to daylight, these authors were prompted to investigate the stability characteristics of gels made from various salts of Carbopol 934. The effects of daylight and of addition of various antioxidants, polyhydroxy compounds, and a chelating agent on these gels were studied. Viscosity was used as the criterion of stability toward oxidative change.

Gels made from various salts of Carbopol 934 all showed large viscosity changes after seventeen days exposure to sunlight. All gels to which antioxidants or polyhydroxy compounds had been added showed little change in viscosity after seventeen days exposure to daylight. The most effective viscosity stabilizer was ethylenediaminetetraacetic acid. The authors suggest that the effectiveness of EDTA may be attributed to its binding of trace metals which otherwise act as catalysts in the oxidative degradation of Carbopol 934.

WARREN E. MCCONNELL

WATER DISINFECTION

The Use of Active Iodine as a Water Disinfectant, Chang, Shih L., J. Am. Pharm. Assoc., Sci. Ed., 47:417 (June) 1958.

This is a follow-up on two previous studies, dealing with the use of elemental iodine as a water disinfectant and its use for such purpose under field conditions. These earlier studies have recommended the use of iodine tablets as the source of elemental iodine. Since, in times of emergency, the iodine tablets described might not be available or the water being treated might have such high alkalinity as to break the buffering capacity of the tablet components, this study was undertaken in order to assemble more complete information on the use of other sources of iodine under more flexible conditions than have previously been reported. Such additional sources would include tincture of iodine, Lugol's solution, and the iodophors.

In order to provide a margin of safety for the destruction of the common pathogens usually present in water supplies, the application of iodine as a water disinfectant should be based on its effectiveness on the more resistant pathogens, such as the cyst of *Endamoeba histolytica* and the more resistant enteric viruses.

The chemistry of the various ionic and molecular species of iodine responsible for its bactericidal activity in aqueous solutions is discussed. It is concluded that given the pH, temperature, and titrable iodine demand of the water, and the iodide content and the preparation of elemental iodine, and with the information previously presented, it should be possible to compute the dosage of the iodine preparation needed to treat the water adequately for drinking purposes. Using *E. histolytica* cysts, the relative cysticidal efficiencies of various species of titrable iodine and the effect of temperature on cysticidal efficiency of I_2 were studied. Equations for computing the cysticidal residual I_2 with a given contact time, and vice versa, at varying temperatures, as well as that for computing the cysticidal residual iodine in I_2 - I_3 systems, are given. The viricidal efficiencies of various species of titrable iodine, using the Coxsackie virus (type B_1) were studied. The production

and determination of survival of the virus were made in monkey kidney tissue cultures and the concentration of virus was estimated by the most probable number method. The effect of temperature on viricidal efficiency of I_2 is discussed and the use of the equations in computing the cysticidal residual iodine for I_2 - I_3 combination is also discussed. Some practical aspects of the use of iodine preparations for water disinfection are considered.

WARREN E. MCCONNELL

PYROGENS, RECOMMENDED TEST FOR

Investigations Concerning Pyrogens, Van der Reyden, G., Pharm. Weekbl. 93:657 (1958).

Several grades of asbestos fibers and activated charcoal have been tested for their pyrogen adsorptive properties. It appeared possible to obtain pyrogen free solutions (0.9% saline, 5% Dextrose, 1.5% or 5% sodium bicarbonate, 3.3% sodium citrate or 1.87% sodium lactate) by adding 0.6% asbestos fibers or 0.3% charcoal powder to the solutions, and filtering through a 3G3 sintered glass filter. The best way to make glass containers pyrogen-free is by using dichromate-sulfuric acid, although sodium hydroxide, sodium carbonate or sodium triphosphate plus a surfactant also can be used. The containers should stand with the detergent overnight, or one hour at 70° C. Rubber and plastic materials must be boiled with 2% sodium carbonate solution for 20 minutes.

Various official pyrogen tests have been criticized, and the following test recommended: Three healthy rabbits weighing 1,500 Gm. or more are used. During the week before the test they must not have lost more than 5% of their weight. The animals are kept in an environment of constant temperature (15° C.) for at least 2 weeks prior to and during the test. Two hours before and during the test, the rabbits are placed in suitable boxes so that a certain degree of freedom is guaranteed. On the day of the test food is withheld. Care must be taken to avoid exciting the animals. The temperature is recorded at intervals of 30 minutes from one hour before until three hours after the injection. A volume of 10 ml. of solution (warmed to 39° C.) per Kg. weight of the rabbit is injected in the large ear vein at a rate of 2 ml. per minute. The initial body temperature of the rabbits is taken just before the injection. It must not differ more than 0.4° C. from the temperature recorded one hour before the injection. The test will be considered negative if none of the three rabbits shows an individual rise in temperature of 0.6° C. or more beyond the initial temperature. If only one rabbit shows an increase of temperature of 0.6° C. or more, the test must be repeated with 5 rabbits. The test should then be considered negative if only one rabbit shows a temperature rise of 0.6° C. or more. The rabbits should have a rest period of at least one week. In testing allergen-containing material the test animal should be injected with only 3 ml./Kg. Test animals must not be used more than once for the same allergen.

J. WOUTER HUISMAN

TABLET PROPERTIES, EFFECT OF DIFFERENT MACHINES ON

A Comparative Study of the Properties of Tablets Compressed with Excentric and Rotary Types of Tablet Machines, Munzel, K. and Seth, P.L., Pharm. Weekbl. 93:317 (1958).

Two portions of the same granulation batch were simultaneously compressed on both types of machines. Dies and punches on both machines were exactly identical in shape and diameter. The tablets were subjected to the following tests: (1) Tensile strengths measured with the Dynstat (see a former abstract); (2) Hardness tested with a Monsanto tester; (3) Loss on rolling (see a former abstract); (4) Surface hardness measured with a micro hardness tester (constructed by C. E. Johannsen, Eskilstuna, Sweden); and (5) Disintegration time.

The results showed that: (1) The excentric tablets (E-tablets) disintegrated slower than the rotary-tablets (R-tablets) and that there are larger deviations in the individual disintegration times of the E-tablets; (2) the E-tablets are harder and show a higher tensile strength than the R-tablets; (3) The loss on rolling of the E-tablets is inferior to that of the R-tablets because the former are harder; (4) In the case of the E-tablet the surface penetration at the lower surface is inferior to that of the upper surface, i.e. the lower surface is harder; and (5) In the case of the R-tablet both surfaces are of similar hardness.

J. WOUTER HUISMAN

OPHTHALMIC SOLUTIONS, SENSITIVITY OF HYPER- AND HYPO-OSMOTIC

Investigations into the Sensitivity of the Human Eye to Hypo- and Hypertonic Solutions as well as Solutions with Unphysiological Hydrogen Ion Concentrations, Trolle-Lassen, C., Pharm. Weekbl. 93:148 (1958).

Eye experiments were carried out on thirty healthy persons, male and female, between 20 and 70 years of age. In all the tests one eye was instilled with the test solution and the other eye with 0.9% sodium chloride. The threshold of irritation was estimated by looking for an irritating concentration while the immediately preceding application did not.

The following results were obtained after statistical analysis: (a) Solutions of NaCl ranging from 0.7 to 1.4% were nonirritating in 99% of the cases. Conclusion: 0.9% sodium chloride is probably the most ideal, but not strictly necessary, concentration. There is a wider margin for hyper- than for hypo-osmotic solutions, although not as wide as Hind and Goyan (0.5 to 2.0%) have stated. (b) For urea, results show that in preparing eye drops it is unnecessary to consider the ability of a substance to pass through physiological membranes. (c) Solutions with a pH between 7.3 and 9.7, all being isosmotic with the lachrymal fluid and prepared by mixing primary, secondary and tertiary sodium phosphate solutions, were found to be nonirritating in 99% of the cases.

The conclusion was that the eye can tolerate a considerably greater deviation in the alkaline direction than in the acid range. The eye will react to an even slight lowering of the physiological *p*H value of 7.4.

J. WOUTER HUISMAN

BACTERIOSTATS FOR PENICILLIN INJECTIONS

Bacteriostatics for Parenteral Injections of Procaine Penicillin, Sargent, C.L., Pharm. Weekbl. 93:81 (1958).

In this article a summary of a report by the British Bacteriostatics Sub-Committee of the Conference on the Control of Antibiotics is given. Experiments were carried out to assess the suitability of several substances as bacteriostatics for procaine penicillin aqueous suspensions. The following substances are mentioned, the used concentrations having been found as roughly equivalent to 0.5% phenol: (a) Phenylmercuric nitrate 0.001%, poor bacteriostatic activity in the presence of the medicament; (b) Benzyl alcohol 1.5%, the suspension became viscous after a few days storage and later developed a yellow color; (c) Phenol 0.5%, same as benzyl alcohol; (d) A mixture of methyl (0.2%) and propyl (0.02%) hydroxybenzoates, in the presence of the medicament not effective in this concentration. Moreover, a precipitate tended to form between the hydroxybenzoates and the medicament, (e) Cetrimide 0.01%, this was the most satisfactory of the substances tested because of its bactericidal properties and its freedom from incompatibilities. About 90% of Cetrimide was found to be adsorbed from an 0.01% solution in procaine penicillin containing 300,000 U./ml., the percentage adsorbed increasing as the particle size of the medicament decreased. Phenol 0.5% and benzyl alcohol 1.5% were adsorbed to a much smaller extent.

J. WOUTER HUISMAN

TABLETS, COMPRESSING ENTERIC COATINGS ON

Enteric Coatings by Compression, James, K.M., Jeffrey, J.G. and MacAulay, W. C., Can. Pharm. J., 91:8 (Aug.) 1958.

The compression of a coating around a core tablet has been made possible by recent advances in tableting machinery. An enteric coating could therefore be applied to a tablet in this manner, providing the coating material posseses certain properties. In addition to the basic requirements necessary for enteric coating, the material must also exhibit those properties necessary to produce a good compressed tablet.

A suitable compressed-enteric coating for tablets, complying with a modified U.S.P. XV disintegration test, was developed after consideration of certain combinations of soluble starch, white dextrin, kaolin, talc, and magnesium stearate. Various concentrations of cellulose acetate phthalate and Polymer C-3 V-30 (a modified vinyl acetate resin) in organic and aqueous solutions were employed as granulating agents.

The suggested coating is producible from a granulation of white dextrin containing 3% magnesium stearate, using a 30% solution of Polymer C-3 V-30 in alcohol as a granulating agent.

ROBERT W. MAHONEY

SUPPOSITORIES, DETERMINATION OF SOME MEDICINAL SUBSTANCES IN

A Contribution to the Determination of Some Medicinal Substances in Suppositories by Means of Extraction, Shtivits, I., Farmaceutski Glasnik 14:77 (Mar.-Apr.) 1958.

In order to simplify the determination of medicinal substances contained in suppositories, the author recommends the use of a simple apparatus consisting of a cap made of filter paper and a ring made of tin. By means of this apparatus the solubility of some medicinal substances, (e.g. diallylbarbituric acid, isoniazid, chloramphenicol, phenobaribtal, hexobarbital, sulfonamides) in petrol naphtha, purified petroleum benzine, and dichlormethane was determined by extracting one gram of the substance with the solvent while heating. From the results obtained the author suggests the following method for determining the above mentioned medicinal substances incorporated into suppositories: Place a suppository in the cap dried beforehand at 100° C. and weighed thereafter, and insert the cap into the ring which is fixed in a cup by means of a cork. Before fixing the ring in the cup transfer 20 ml. of petrol naphtha to the cup. Extraction is accomplished within 30 minutes on a water-bath or a heating-plate under a return-cooler. After the extraction process is completed, transfer the cap containing the remainder of the suppository to a small glass weighed beforehand, dry for 30 minutes, and weigh thereafter. The weight of the remainder is utilized in the determination of the medicinal substance.

HUBERT ZACEK

ISOTONIC-EUHYDRIC SOLUTIONS, PREPARATION OF

Hypertonic Solutions in Isotonic-Euhydric Adjustment, Rektorik, Z., Rybacek., L., and Zajicek, R., Ceskoslovenska farmacie (Czechoslovakia) 7:320 (June) 1958.

The preparation of isotonic-euhydric solutions is made easier when diluting appropriate hypertonic solutions. These hypertonic solutions must contain 1/9 as much of the dissolved substances as the isotonic solutions, i.e. when diluting the hypertonic solutions to 90%, they become isotonic. The following formula is to be used when preparing isotonic-euhydric solutions according to the above mentioned principle: $x = 100\ i$, where x = amount of an appropriate hypertonic solution required for diluting and i = amount of sodium chloride required for isotonization (to be found in suitable tables). When solutions to be isotonized by potassium nitrate are dealt with, the formula to be used is $x = 55.6\ i_{KNO_3}$ where x is the same as mentioned above and i_{KNO_3} = amount of potassium nitrate required for isotonization.

HUBERT ZACEK

GLYCERIN, EFFECT OF INTRAVENOUS INJECTIONS CONTAINING

Effects of the Intravenous Administration of Glycerol Solutions to Animals and Man, Sloviter, H., J. Clin. Invest. 37:619 (May) 1958.

The investigation has shown that a considerable quantity of glycerol in a relatively dilute solution containing electrolyte can be administered intravenously to animals (rabbits and dogs) and man without producing toxic effects. Solutions containing 5% glycerol, 5% glucose, and 0.9% sodium chloride were used in the human studies. Observations were focused on blood pressure, respiratory rate, body temperature, and hemoglobin concentrations.

In contrast to previous clinical reports of hypertension, hemoglobinemia and central nervous system disturbances with parenteral glycerol, such toxic effects were not observed in the present study. It was concluded that differences in the results were due to differences in the concentration and composition of the solution, to differences in the rate and particular parenteral route of administration, and to specie differences in the experimental animals used. It was pointed out that the toxic effects were due to the osmotic disturbances that the glycerol in high concentrations caused rather than to the inherent toxicity of glycerol.

NORMAN HO

CYANOCOBALAMIN INJECTION ASSAY

Assay of Injection of Cyanocobalamin in Presence of Preservatives, Bhattacharya, R. and Bardham, D., Indian J. Pharm. 20:156 (June) 1958.

In the *British Pharmacopoeia* method of assaying cyanocobalamin injections, interference of the spectral absorption by the presence of preservatives in commercial samples is demonstrated. The preservatives used were phenol, p-chloro-*m*-cresol, and benzyl alcohol. A modification of the official assay was suggested for cyanocobalamin in injections, that is, the use of a solution of the preservative of a similar concentration as the blank in the assay of those injections containing preservatives.

NORMAN HO

STERILIZATION OF SYRINGES, INFRA-RED

Sterilization of Syringes by Infra-red Radiation, Darmady, Hughes, Tuke, J. Clin. Pathol. 10:291 (1957).

The utilization of infra-red radiation for the sterilization of syringes displaces many of the disadvantages encountered when using steam sterilizers or hot-air ovens. The syringes are pre-sealed in the containers in which they will be dispensed and are then placed on a moving belt that passes through an insulated tunnel over which infra-red projectors are placed at pre-determined positions.

The advantages of this method are that it reduces "heating-up" time, allows the syringes to be pre-sealed in their containers before sterilization, ensures sterility as can be shown by rigid bacteriological control, and allows less skilled help to carry out the operation.

ROBERT L. RAVIN

PROTEOLYTIC OINTMENT

The Interaction of Papain, Urea and Water-Soluble Chlorophyll in a Proteolytic Ointment for Infected Wounds, Miller, J.M., Surgery 43:939 (June) 1958.

Quite recently, a proteolytic ointment was developed which eliminates many of the practical limitations of proteolytic agents that are in current use. The ointment, which consists of commercial papain 10%, urea 10% and water-soluble chlorophyll 0.5%, is stable indefinitely on storage, uniformly active when applied to wounds, and is virtually without untoward effects even when allowed to remain on the wound for prolonged periods of time. (Note: no formula was given for the ointment base.)

ROBERT L. RAVIN

MEPERIDINE-LEVALLORPHAN MIXTURES, USE IN RECOVERY ROOM

Use of Meperidine and Meperidine-Levallorphan Mixture in the Recovery Room, Sadove, Max S. et al, J. Am. Med. Assoc. 166.1432 (Mar. 22) 1958.

One hundred sixty patients with pain were studied during the immediate postoperative period in the recovery room. Twenty-five mg. of meperidine given intramuscularly provided as much analgesia as did 50 mg. during the first hour after administration of the narcotic. The smaller dose is preferred because it caused less respiratory depression and sedation. Nevertheless, the slight depression of the respiratory minute volume produced by 25 mg. of meperidine was statistically significant. The simultaneous administration of levallorphan and meperidine reduced the extent of the respiratory depression without interfering with analgesia. The ratios of meperidine to levallorphan which are preferred are 100:1 and 80:1.

AUTHOR'S SUMMARY

THERMOCOUPLES, RECORDING ANIMAL TEMPERATURE WITH

The Use of Thermistors and Point Record for Simultaneous Registration of Rectal Temperatures of Animals, Zatrepalek, J., Ceskoslov. Farm. 7:257 (May) 1958.

An apparatus is described for registering simultaneously the rectal temperatures or temperatures of six other sites

in the range 35-43°C. It consists of six similar bridges with thermistors connected in the arm of each animal. The non-equilibrium of the bridges is registered by a common-type point recorder. The individual curves are differentiated by color. The mechanism is described of the rectal sounds and the calibration procedure given. Temperature records of rabbits are shown.

AUTHOR'S SUMMARY

"PHARMACY"—DEFINITION OF THE TERM

What Is Pharmacy? Levinshtein I. I., Aptechnoe Delo (U.S.S.R.) 7,4:10 (July-Aug.) 1958.

In this article, the purpose of which is to make a contribution to the pharmaceutical terminology, the author first of all criticizes various definitions of the term "pharmacy" as used by many Soviet pharmaceutical scientists. He then describes the history of pharmacy in various countries, especially in Russia before 1917, in order to give a more precise explanation of the term "pharmacy" and make its understanding easier when based upon historical facts. The readers' attention is drawn to the research work of many famous Russian pharmaceutical scientists (e.g. Nelyiubin, Dragendorff, Lovits) whose achievements were not appreciated at all in Russia before 1917. It therefore was not possible in that period to develop pharmacy as a branch with solid scientific background and to raise the pharmacists' social significance. Today, the situation is quite different. The pharmacists' activities manifest themselves in various domains concerning medicaments and related objects. The definition of the term "pharmacy" can therefore be formulated as follows: Pharmacy is a complex of sciences and practical knowledge dealing with the problems of obtaining, isolation, research, storage, preparing, and dispensing of drugs as substances or as preparations, and of medico-prophylactic substances.

HUBERT ZACEK

STERILE BLOOD SERUM, PREPARATION OF

Improving the Method of Preparation of Sterile Blood Serum for Medicinal Preparations, Bielenkiy N.G., Poshariskaya L.S., Kuzenko E.V., and Volkova A.G., Meditsinskaya Promyshlennost S.S.S.R. (U.S.S.R.) 12,8:18 (Aug.) 1958.

Until today, the following method for the preparation of sterile blood serum for medicinal purposes (production of blood substitutes et cetera) was most commonly used: the serum was separated from the animal blood by letting settle down the erythrocytes by a standing of 48 - 72 hours; the blood serum was then sterilized by filtering through asbestos plates. A perfectioning of this process was reached by the use of mechanical separators for the separation of the serum from the blood. The output of the serum in the former method was 25 - 30% (related to the weight of the blood) whereas it amounted to 60 - 65% when preparing the serum according to the latter method. Among the other most important advantages there is, for example, considerable reduction of the duration of the process. An essential condition of the effectiveness of the new method for preparing the blood serum is a good preliminary treating (defibrinization) of the blood. However, when filtering the blood serum that was separated from defibrinized blood by means of a mechanical separator, the authors have ascertained a definite slowing down of the filtering process. Within the scope of the investigation of the cause of this disturbance it has been found by the authors that the serum obtained by processing the defibrinized blood by means of a mechanical separator contains a remaining fraction of fibrinogen or of a component of the latter. When filtering the serum, fibrin is formed from fibrinogen upon the asbestos plates. In this way, the pores are obstructed and the filtering process slowed down. In order to suppress this inconvenience the authors suggest to hold the separated serum at the temperature of -1°C during 5 to 6 hours. In this period, fibrin-like cakes are formed in the serum liquid after separation of which the filtration is easy and rapid.

HUBERT ZACEK

ISOTONICITY VALUES OF BORIC ACID AND SODIUM ACID PHOSPHATE

Cryoscopic Values of Solutions of Boric Acid and Acid Sodium Phosphate, Rektorik, Z., Rybacek, L. and Zajicek, R., Ceskos. Farm. 7:318 (June) 1958.

Determination is given in a deltameter of cryoscopic values of solutions of boric acid and acid sodium phosphate that differ from those cited in literature.

According to the results, 1.69% solution of boric acid (Δ=0.520°) and 2.38% solution of acid sodium phosphate ($NaH_2PO_4 \cdot 2\ H_2O$) are isotonic.

AUTHOR'S SUMMARY

The Development Pharmaceutical Center, Prague.

CURRENT LITERATURE

. . . also calling your attention to the following articles appearing in recent hospital and pharmaceutical journals

. . . . . .

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Lantos, Robert L.: Responsibilities of the Chief Pharmacist to Hospital Administration—Part I, *Hosp. Management* 86:40 (Sept.) 1958.

—Inventory

Sallee, Arthur J.: Pharmacy Inventory Problems in Hospital Financial Management, *Hosp. Management* 86:44 (Sept.) 1958.

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Moravec, Daniel F.: The Modern Hospital Pharmacist, *Hosp. Management* 86:45 (Sept.) 1958.

DRUG EVALUATIONS

by the Council on Drugs of the American Medical Association

► THE FOLLOWING MONOGRAPHS and supplemental statements on drugs have been authorized by the Council on Drugs of the American Medical Association for publication and inclusion in *New and Nonofficial Drugs*. They are based upon the evaluation of available scientific data and reports of investigations. In order to make the material even more valuable, dosage forms and preparations of individual drugs have been added to the monographs. These dosage forms and preparations were not taken from material published in the *Journal of the American Medical Association* by the Council on Drugs; rather, they were obtained from such manufacturers' brochures, news releases, etc., which were available to us at the time of publication. An attempt has been made to make the list of dosage forms as complete as possible. However, no guarantee can be made that the list of preparations is complete and it is suggested that hospital pharmacists consult manufacturers' releases for additional dosage forms and preparations.

The issues of the *Journal of the American Medical Association* from which each monograph has been taken is noted under each monograph. Monographs in this issue of the JOURNAL include those published in the *Journal* to August 16, 1958.

Notice

New and Nonofficial Drugs 1958 is now available from your local bookstore and from the publishers, J. B. Lippincott Company, Philadelphia, Pa. This 1958 edition contains monographs of drugs evaluated by the Council on Drugs of the American Medical Association and published in the Journal of the A.M.A. to January 1, 1958. The index listed below contains those drugs evaluated and published between January 1, 1958 and August 16, 1958.

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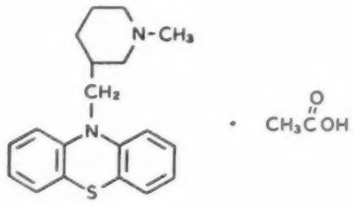
Mepazine Acetate — Pacatal® Acetate

Mepazine acetate is 10-[(1-methyl-3-piperidyl)methyl]phenothiazine acetate. The structural formula of mepazine acetate may be represented as follows:



Actions and Uses

Mepazine acetate has the same actions and uses as mepazine hydrochloride, except that it is administered parenterally. (See the monograph on mepazine hydrochloride.)

Dosage

Mepazine acetate is administered by intramuscular or intravenous injection. For severely agitated psychotic patients, the dose by either route is 50 mg. three or four times daily. For the treatment of severe nausea and vomiting, daily doses of 25 to 75 mg. are injected intramuscularly. Dosage for use in surgical and obstetric patients has not been firmly established, but single intramuscular or intravenous doses ranging from 50 to 200 mg. or more have been employed.

Mepazine acetate may be injected parenterally either as the full-strength solution or as a diluted solution. Chloride or alkaline solutions should not be used as diluents since they cause precipitation of mepazine acetate. Oral therapy with the hydrochloride salt should be substituted for parenteral injection as soon as possible.

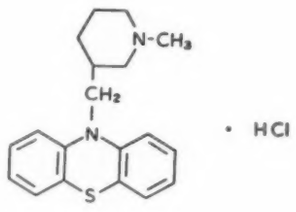
Preparations: solution (injection) 50 mg. in 2 cc.
Applicable commercial name: Pacatal Acetate.
J. Am. Med. Assoc. *167*:1632 (July 26) 1958.

Preparations

Injection Mepazine (Pacatal) Acetate 25 mg. per ml.; 2 ml. ampuls.

Mepazine Hydrochloride — Pacatal® Hydrochloride

Mepazine hydrochloride is 10-[(-methyl-3-piperidyl)methyl]-phenothiazine hydrochloride. The structural formula of mepazine hydrochloride may be represented as follows:



Actions and Uses

Mepazine hydrochloride is a phenothiazine derivative with actions and uses similar to, but not identical with, those of chlorpromazine. Although less potent, mepazine is not merely a weak chlorpromazine. Pharmacological studies indicate that it differs from chlorpromazine in that it does not lower the body temperature in rats as does chlorpromazine; it does not antagonize the waltzing syndrome in mice as does chlorpromazine; and it augments carotid sinus

reflexes in cats whereas chlorpromazine inhibits them. The significance of these differences with respect to its clinical usefulness is, at present, unclear. The drug is used principally for its calming or tranquilizing action in the management of neuroses and psychoses in which anxiety, tension, agitation, and increased psychomotor activity are predominant: it is said to exert a selective action to normalize the thinking process of mentally or emotionally disturbed patients. Because mepazine is less potent than chlorpromazine, it does not produce the excessive sedation, drowsiness and depression which frequently accompany therapy with the latter drug. On the other hand, the diminished potency of mepazine makes it less effective than chlorpromazine for the long-term control of the most severe forms of agitation and tension: it has little or no immediate effect on acute psychotic disturbances. In terms of over-all psychotherapeutic effectiveness, mepazine might be considered to be intermediate between the most potent agents such as chlorpromazine and the milder agents such as meprobamate.

Like chlorpromazine and other phenothiazine derivatives, mepazine hydrochloride exerts an antiemetic effect and may be used for the control of nausea and vomiting from a variety of causes. The drug has also been used for its calming effects in surgery, in obstetrics, and in anesthesia. Other reported clinical applications include use in narcotic withdrawal to control restlessness and agitation, in chronic alcoholism to lessen anxiety and tensions, and in advanced neoplastic states to reduce the quantity of narcotics needed for control of pain. However, sufficient evidence is not available to establish its usefulness for the latter purposes.

The acute toxicity of mepazine hydrochloride in experimental animals is less than that of chlorpromazine hydrochloride, and, in general, its clinical use is followed by a somewhat lower incidence of side-effects and untoward reactions. As already indicated, the usual doses produce a calming effect, with little sedation and drowsiness. Although jaundice has not as yet been observed with administration of mepazine, physicians should be alert to its possible occurrence. The drug should not be given to patients with a history of jaundice or liver damage. The most frequent side-effects of mepazine are atropine-like in nature and include blurring of vision, dryness of the mouth, and constipation. Since constipation can lead to more serious forms of intestinal obstruction, it should not be neglected; if necessary, laxatives should be prescribed. Less frequent side-effects include occasional dizziness, tremor, urinary retention, and transient hypotension. The most serious toxic reaction to mepazine is referable to hematopoietic depression. As with chlorpromazine, the drug can produce leukopenia and granulocytopenia. It should, therefore, be used with discretion, peripheral blood cell counts are indicated at frequent intervals during therapy, and patients should be advised to report to the physician immediately upon the onset of fever, sore throat or marked weakness. Because it potentiates the action of other central nervous system depressants, mepazine is contraindicated in patients under the influence of large doses of narcotics, barbiturates, or unknown large quantities of alcohol.

Dosage

Mepazine hydrochloride is administered orally. For the treatment of ambulatory neurotic patients, the usual initial dose is 25 mg. three or four times daily. This dosage can be increased every week by increments of 25 mg. per day until the desired effect has been attained. For those psychiatric conditions which are severe enough to require hospitalization of the patient, the initial dose is 100 mg. per day; this may be increased by 50 mg. every five to seven days. Maintenance dosage for such patients is usually 400 mg. per day or more.

For treatment of nausea and vomiting, the dosage ranges from 50 to 100 mg. per day. Dosage for use in surgical and obstetric patients has not been firmly established; single doses ranging from 50 to 200 mg. or more have been employed.

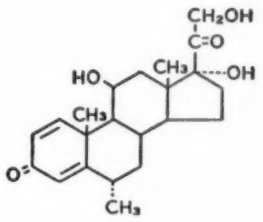
Preparations: tablets 25, 50, and 100 mg.
Applicable commercial name: Pacatal Hydrochloride.
***J. Am. Med. Assoc.* 167:1633 (July 26) 1958.**

Preparations

Tablets Mepazine (Pacatal) Hydrochloride 25 mg., 50 mg., and 100 mg.

Methylprednisolone — Medrol®

Methylprednisolone is 6α-methylprednisolone. The structural formula of methylprednisolone may be represented as follows:



Actions and Uses

Methylprednisolone shares the actions and uses of prednisolone, to which it is identical chemically except for the addition of a methyl group at the 6-alpha position. The methyl derivative has an anti-inflammatory potency slightly greater than that of an equal amount of prednisolone; at the same time, it induces somewhat less retention of sodium and water. It is of value for the management of those rheumatic, allergic, dermatological, and ocular disorders known to be responsive to anti-inflammatory glucocorticoids. While not as yet substantiated clinically, it is anticipated that methylprednisolone will ultimately have a place akin to that of other corticosteroids in the temporary control of acute leukemia and other mesenchymal neoplasms, as well as in certain diseases such as nephrosis or ulcerative colitis. The drug is probably not as effective as cortisone or hydrocortisone for the management of acute adrenocortical insufficiency, since it does not exert significant mineralocorticoid activity at the usual doses.

Although methylprednisolone induces somewhat less water and sodium retention than prednisolone, it is capable of producing the same untoward reactions. Peptic ulcer appears to develop rarely in patients receiving methylprednisolone. However, further clinical experience will be necessary to evaluate accurately the incidence of this undesirable side-effect. Hence, all the precautions and contraindications pertinent to the use of prednisolone are applicable to methylprednisolone. (See the general statement on glucocorticoids in New and Nonofficial Drugs.)

Dosage

Methylprednisolone is administered orally. Dosage should be individualized according to severity of symptoms, degree of response, appearance of side-effects, and anticipated duration of steroid therapy. Because it causes less water and sodium retention than most other glucocorticoids, the usual early sign of overdosage, i. e., a gain in body weight, is not a reliable index of overdosage with methylprednisolone. After relatively high initial doses, the ideal goal of maintenance therapy is to reduce dosage to the lowest possible level compatible with satisfactory clinical response.

In general, the dosage of methylprednisolone is about two-thirds the required daily dose of prednisolone or prednisone. The drug should be given in four divided doses, preferably after meals and at bedtime. For severe or acute conditions, suppressive doses ranging from 20 to 40 mg. or more per day are given. The suggested dose for acute

rheumatic fever is 0.5 mg. per pound of body weight daily until the erythrocyte sedimentation rate has remained normal for one week. For mild or chronic conditions, the initial daily dose ranges from 6 to 20 mg. In chronic diseases, this initial dosage is reduced to maintenance levels by decrements of not more than 2 mg. every seven days. Ultimately, the maintenance dose is usually about one-half the original dose required for the initial control of symptoms.

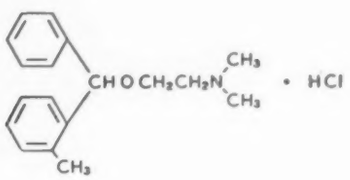
Preparations: tablets 2 mg. and 4 mg.
Applicable commercial name: Medrol.
The Upjohn Company cooperated by furnishing scientific data to aid in the evaluation of methylprednisolone.
J. Am. Med. Assoc. 167:1936 (Aug. 16) 1958.

Preparations

Tablets Methylprednisolone (Medrol) 2 mg., cross-scored, and 4 mg., scored.

Orphenadrine Hydrochloride Disipal® Hydrochloride

Orphenadrine hydrochloride is N,N-dimethyl-2-(*o*-methyl-α-phenylbenzyloxy) ethylamine hydrochloride. The structural formula of orphenadrine hydrochloride may be represented as follows:



Actions and Uses

Orphenadrine hydrochloride, the *o*-methyl analogue of the antihistamine, diphenhydramine hydrochloride, produces a reduction of voluntary muscle spasm. The effect is central, presumably by an inhibitory action on cerebral motor areas, and resembles the central effects of atropine. Orphenadrine exerts only weak antihistaminic and sedative effects. It is not primarily a peripherally acting anticholinergic agent since, in therapeutic doses, it produces few of the typical effects on smooth muscle, the eye, or secretory glands which characterize atropine and other peripheral parasympathetic blocking agents. The skeletal muscle relaxation is not of the type produced by mephenesin or zoxazolamine, since there is no evidence that it interrupts transmission through peripheral neuromuscular pathways. Nor is there any indication that it acts at the myoneural junction in the manner of the curariform drugs; it does not cause ganglionic blockade.

Orphenadrine has been used for the symptomatic management of paralysis agitans (Parkinson's disease). Subjective observations seem to indicate that the drug may bring about beneficial effects in approximately half of the patients so treated. Rigidity is apparently relieved much more readily than is tremor; in occasional patients with severe spasticity, tremor may even be accentuated as the spasticity is relieved. Other salutary effects ascribed to the action of the drug include relief of oculogyria, sialorrhea, diaphoresis, blepharospasm, and disturbances in gait and balance. The drug also exerts a euphoriant effect which is useful in combating the depression and fatigue that frequently accompany this syndrome. In common with other antiparkinsonian drugs, the therapeutic effectiveness of orphenadrine diminishes with prolonged use. For this reason, and because it is considered somewhat less active than other antiparkinsonian drugs, orphenadrine is probably best employed as an adjunct to such other agents as procyclidine, trihexyphenidyl, cycrimine, or benztropine for the treatment of paralysis agitans. It may, however, be tried alone for patients who have become refractory to the other antiparkinsonian drugs.

Because of its antispastic effect on voluntary muscle, orphenadrine has been proposed for use in a variety of clinical conditions which may be unrelated in etiology but in which pain due to skeletal muscle spasm is present. These have been described as sprains, strains, fibrositis, whiplash injuries, noninflammatory rheumatic and arthritic states, and torticollis. Although such use might be considered a logical clinical application of the drug's pharmacological action, the evidence available to date is not adequate to permit a sound conclusion as to the ultimate effectiveness of such therapy. Further studies are also needed to confirm the possible usefulness of orphenadrine in the treatment of the extrapyramidal involvement associated with high doses of reserpine or phenothiazine-type tranquilizing agents.

The clinical toxicity of orphenadrine hydrochloride appears to be low, at least with therapeutic doses. Thus far, side-effects have been limited to nausea, dryness of the mouth, dizziness, mild excitation, and occasional hallucinations. Most of these effects tend to subside or disappear with a reduction in dosage. Because of its anticholinergic classification, orphenadrine should be administered cautiously to patients with glaucoma, tachycardia, or urinary retention.

Dosage

Orphenadrine hydrochloride is administered orally. The usual initial dose is 50 mg. given three times a day. This dosage should then be adjusted according to the clinical response of the individual patient and the appearance of side-effects.

Preparations: tablets 50 mg.
Applicable commercial name: Disipal.
Riker Laboratories, Inc., cooperated by furnishing scientific data to aid in the evaluation of orphenadrine hydrochloride.
J. Am. Med. Assoc. 167:1634 (July 26) 1958.

Tablets Orphenadrine (Disipal) Hydrochloride 50 mg.

Pancreatic Dornase Dornavac®

Pancreatic dornase is a stabilized preparation of the enzyme, deoxyribonuclease, prepared by fractional precipitation of aqueous acid extracts of beef pancreas followed by dialysis, sterilization by filtration, and lyophilization. The activity of pancreatic dornase is determined by measuring the rate at which it reduces the viscosity of thymus deoxyribonucleic acid, potency being expressed in terms of units. One unit is an amount of enzyme which causes a drop of one viscosity unit in 10 minutes at 30° C, where the flow-time of water is taken as one viscosity unit.

Actions and Uses

Pancreatic dornase is derived from beef pancreas, and, in contrast to the deoxyribonucleases produced by hemolytic streptococci (streptodornase), it is a single nuclease. Like streptodornase, it acts directly upon a substrate of deoxyribonucleoprotein (and deoxyribonucleic acid). The action of pancreatic dornase has been characterized as one of rapid depolymerization, with a resulting decrease in viscosity of purulent material. Pancreatic dornase degrades deoxyribonucleoprotein to relatively large-sized fragments, thus differing from streptodornase, which continues this degradation through to free purine and pyrimidine compounds. Pancreatic dornase acts only on extracellular accumulations and disintegrating cells but not on living material. Enzymatic degradation is completed within the first few minutes of contact with the substrate.

Inhalation therapy with aerosols of pancreatic dornase has been employed to reduce the tenacity of pulmonary secretions and to facilitate the expectoration of sputum in certain bronchopulmonary infections in which thick mucopurulent secretions, particularly mucopurulent plugs, are

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- HOMATROPINE HBr 5%
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- PATIENT USE

present. On the basis of purely subjective observations, it is the clinical impression of most investigators that inhalation therapy with pancreatic dornase definitely benefits patients with purulent tracheobronchitis, bronchiectasis, abscesses, atelectasis, unresolved pneumonia, chronic bronchial asthma, and emphysema in which tenacious pulmonary secretions are a complicating factor. In a sizable percentage of such patients, clinical improvement is manifested by a change in the character of the sputum from a thick, gelatinous consistency to a thin, milky material which may be raised more easily. Part of the beneficial action of pancreatic dornase in the foregoing conditions has been ascribed to an ability of the enzyme to allow concomitantly administered antibiotics to reach the area of infection more readily. Thus far there is inadequate experimental evidence to support this view. The use of the drug as an adjunct in obtaining bronchial secretions and cellular debris for cytological study in patients with suspected bronchogenic carcinoma must be considered experimental.

The clinical toxicity of pancreatic dornase appears to be minimal, and aerosols of the drug are better tolerated than similar aerosols of crystalline trypsin. From experience to date, it would appear that allergic phenomena do not constitute a serious problem. Nevertheless, sensitivity to beef protein should be kept in mind; a few reported cases of dyspnea and generalized hypersensitivity reactions suggest that allergy can occur after prolonged use. More experience is needed to determine the ultimate sensitizing potential of pancreatic dornase.

Dosage

Pancreatic dornase is administered by inhalation. The freeze-dried powder of purified enzyme should be reconstituted with 2 cc. of sterile isotonic solution of sodium chloride immediately prior to use. Best results are reported when the drug is administered as an aerosol, either a direct nebulizer-oxygen tank arrangement or an intermittent positive-pressure breathing apparatus being used. When the latter method is employed, more complete ventilation of the lung and better distribution of the enzyme take place. It is questionable whether the use of ordinary hand atomizers or nebulizers is an effective method of treatment.

For the treatment of bronchopulmonary infections, the suggested dosage is 50,000 to 100,000 units once to three times daily for a period of two to six days, until improvement occurs and the maximal response is obtained. Treatment may be repeated after an interval of a few days or when clinical symptoms indicate further need of therapy. For use as an adjunct in obtaining specimens of bronchial secretions and cellular debris for cytological study, the proposed dose is 100,000 units given as a single dose prior to bronchoscopy, or treatment may be continued over a period of days.

Preparations: powder (inhalant) 100,000 units with 2 cc. of sterile diluent.

Applicable commercial name: Dornavac.

Merck Sharp & Dohme Research Laboratories, Division of Merck & Co., Inc., cooperated by furnishing scientific data to aid in the evaluation of pancreatic dornase.

J. Am. Med. Assoc. **167**:1634 (July 26) 1958.

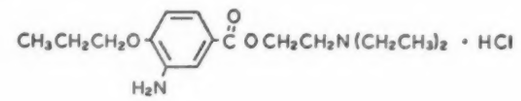
Preparations

Inhalant Pancreatic Dornase (Dornavac) 100,000 Units, with 2 ml. vials sterile diluent.

Proparacaine Hydrochloride

Ophthaine® Hydrochloride

Proparacaine hydrochloride is 2-diethylamino-ethyl 3-amino-4-propoxybenzoate hydrochloride. The structural formula of proparacaine hydrochloride may be represented as follows:



Actions and Uses

Proparacaine hydrochloride is an effective surface anesthetic agent useful in ophthalmology. Although it is a benzoic acid ester, proparacaine is chemically distinct from such other agents as procaine, benoxinate, or tetracaine in that the amino group is in the *meta* rather than in the *para* position. This difference in chemical structure may explain the lack of cross sensitization between proparacaine and other local anesthetic agents. Proparacaine has an anesthetic potency slightly greater than that of an equal amount of tetracaine. Its onset of action is rapid; surface anesthesia of sufficient intensity to permit tonometry can generally be obtained within about 20 seconds after the instillation of 1 or 2 drops of a 0.5% solution. The duration of such anesthesia is about 15 minutes. Unlike some other topical anesthetics, proparacaine produces little or no initial irritation, stinging, or burning. It does not cause visible hyperemia, lacrimation, increased winking, epithelial drying, or stippling of the cornea, nor does it affect pupillary size. Thus, from the standpoint of onset and duration of action, intensity of anesthesia, and patient-tolerance, proparacaine appears to compare favorably with other agents used as ophthalmic anesthetics.

Proparacaine hydrochloride is useful for most ocular procedures that require topical anesthesia. Among these are tonometry, removal of foreign bodies and sutures, gonioscopy, conjunctival scraping for diagnosis, removal of chalazions from the conjunctival surface, and short operative procedures involving the cornea and conjunctiva. The drug may be used as a surface anesthetic prior to the retrobulbar injection of procaine for intraocular or orbital surgery. Proparacaine has also been employed as the sole anesthetic for cataract extractions and glaucoma surgery. If the drug is instilled at frequent intervals prior to beginning surgery, the depth and duration of anesthesia thus produced may be sufficient to permit these procedures.

Although laboratory studies indicate that proparacaine is too toxic for use as an injection anesthetic, its ophthalmic use has been notably free of side-effects or untoward reactions. To date, there have been few reports of drug sensitivity, either local or systemic. The drug is apparently safe to use in patients who are sensitive to procaine, benoxinate, and tetracaine. Possible deleterious effects or delays in wound healing occasioned by the long-term ophthalmic use of proparacaine are not known but they should be watched for.

Dosage

Proparacaine hydrochloride is administered only by topical instillation in the eye as a 0.5% solution. For tonometry, the usual dose is 1 or 2 drops immediately before measurement. For removal of sutures, the instillation of 1 or 2 drops two or three minutes before beginning the procedure is usually adequate; this dose is also used for removal of foreign bodies. When deep anesthesia is required, as in cataract extraction, 1 drop is instilled every 5 to 10 minutes for five to seven doses.

Preparations: solution (topical) 5 mg. per cc.
Applicable commercial name: Ophthaine.

E. R. Squibb & Sons, Division of Olin Mathieson Chemical Corporation, cooperated by furnishing scientific data to aid in the evaluation of proparacaine hydrochloride.

J. Am. Med. Assoc. 167:1936 (Aug. 16) 1958.

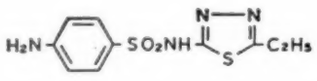
Preparations

Solution, Ophthalmic, Proparacaine (Ophthaine) Hydrochloride 0.5%; 15 ml. bottles.

Sulfaethidole

Sul-Spansion®
Sul-Spantab®

Sulfaethidole is N^1-(5-ethyl-1,3,4-thiadiazole-2-yl) sulfanilamide. The structural formula of sulfaethidole may be represented as follows:



Actions and Uses

Sulfaethidole is identical in chemical structure to sulfamethizole except that it contains an ethyl rather than a methyl group at the 5 position of the thiadiazole ring. It is, however, a much longer acting drug than sulfamethizole although its spectrum of activity is the same. The drug is useful for the treatment of systemic and urinary tract infections due to organisms sensitive to the bacteriostatic action of sulfonamides. It is readily absorbed from the gastrointestinal tract but does not undergo an appreciable degree of acetylation in the body; about 90 to 95% of the total blood and urine sulfonamide appears as the free form. Both the free and the conjugated forms of sulfaethidole are soluble in urine over a wide pH range. Hematuria, crystalluria, and other indications of renal toxicity have been rarely encountered during therapy with this compound. Because the drug is prepared in a sustained release form, therapeutic blood levels usually can be maintained for a sufficiently long time to necessitate oral administration only once every 12 hours.

The side-effects to be expected with sulfaethidole are the same as with other sulfonamides. However, the incidence of such side-effects—renal, systemic, or dermal—has been much lower. Serious side-effects, such as granulocytopenia and hemolytic anemia, have not been reported to date. Sulfaethidole is contraindicated only in patients with known sulfonamide sensitivity. (See the general statement on sulfonamide compounds in New and Nonofficial Drugs.)

Dosage

Sulfaethidole is administered orally. The average maintenance dose for adults is 1.3 Gm. every 12 hours. This dose may be increased by one-third (1.95 Gm.) in severe infections, or decreased one-third (650 mg.) for prophylaxis. The average maintenance dose for children is 330 mg. per 25 lb. (11 kg.) of body weight every 12 hours. This dose may be doubled in severe infections or halved for prophylaxis. Initial (priming) doses should be double the maintenance doses.

Preparations: suspension (sustained release, oral) 130 mg. per cc.; tablets (sustained release) 650 mg.

Applicable commercial names: Sul-Spansion, Sul-Spantab.

Smith Kline & French Laboratories cooperated by furnishing scientific data to aid in the evaluation of sulfaethidole.

J. Am. Med. Assoc. 167:1937 (Aug. 16) 1958.

Preparations

Suspension Sulfaethidole (Sul-Spansion) 0.65 Gm. per 5 ml.
Tablets Sulfaethidole (Sul-Spantab) 0.65 Gm.

Crystalline Trypsin

Intramuscular Use of in Pulmonary Diseases

The Council has evaluated the available evidence for the use of intramuscularly administered aqueous solutions or oil suspensions of crystalline trypsin (Parenzyme) as an adjunct to the treatment of severe bronchopulmonary diseases which are characterized by tenacious secretions not susceptible to the action of expectorants. Included among such conditions are bronchial asthma, emphysema, and bronchiectasis. The enzyme is intended to reduce the viscosity and, hence, to facilitate the expectoration of thick, mucopurulent, pulmonary secretions, particularly inspissated mucopurulent plugs.

The available evidence for the intramuscular use of the drug for the foregoing types of pulmonary disease constituted a small number of case reports on patients in whom some improvement was observed on the basis of x-ray changes, increased vital capacity, lessened respiratory embarrassment, and ease with which the sputum was raised. Since the case histories were uncontrolled, the criteria used to demonstrate improvements may not be reliable. In a number of case histories the concomitant use of antibiotics complicated the evaluation of trypsin for bronchial pulmonary diseases. Hence, the Council concluded that its usefulness for pulmonary diseases has not yet been fully established by the evidence so far available.

The usual doses for intramuscular injection of crystalline trypsin vary from 2.5 mg. to 5 mg. one to four times daily for a period of three to eight days. Dosage must be individualized depending on the severity of symptoms and the degree of response. Adequate precautions against accidental intravenous injection should be exercised.

The Council voted to amend New and Nonofficial Drugs accordingly to describe the intramuscular use of crystalline trypsin in pulmonary disease.

The National Drug Company cooperated by furnishing scientific data to aid in the evaluation of this additional use of crystalline trypsin.

J. Am. Med. Assoc. 167: 1635 (July 26) 1958.

Chemical Laboratory

Monographs and Tests

The Chemical Laboratory has authorized publication of the following statement.

WALTER WOLMAN, Ph.D., *Director*

Monographs of tests and assays for new and nonofficial drugs adopted by the Chemical Laboratory of the American Medical Association represent an expression of opinion as to what might constitute adequate tests and assays to serve as a reference guide to those interested in the identity and quality of a new and nonofficial drug.

Completed monographs are published in the journal *Drug Standards* for those interested in the details of the procedures. Monographs on the following drugs have appeared in the May-June, 1958, issue of that journal. The cooperation of the listed pharmaceutical firms that furnished samples and data is acknowledged.

Chlorquinaldol ----------(Geigy Pharmaceuticals)
Hydroxyzine hydrochloride----------(J. B. Roerig & Co.)
Tricyclamol chloride--------(Burroughs-Wellcome & Co., Inc.)
(Eli Lilly & Company)
Zoxazolamine----------(McNeil Laboratories, Inc.)

J. Am. Med. Assoc. 168:185 (Sept. 13) 1958.

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MEETING DATES 1958

November

Maryland-District of Columbia-Delaware Hospital Association
(Includes Hospital Pharmacy Section) November 3-5, Washington, D. C. Hotel Shoreham

Military Surgeons of the U.S.
November 16-19, Washington, D. C. Hotel Statler

December

American Association for the Advancement of Science
December 26-31, Washington, D. C.

1959

April

Southeastern Society of Hospital Pharmacists
(In conjunction with Southeastern Hospital Conference April 8-10, Atlanta, Georgia. Atlanta Biltmore Hotel

American Pharmaceutical Association
Annual Convention, April 19-25, Cincinnati, Ohio

American Society of Hospital Pharmacists
Annual Meeting, April 19, 20 and 21, Cincinnati, Ohio

Tri-State Hospital Assembly
(Includes Section on Hospital Pharmacy) April 27-29, Chicago. Palmer House.

May

Association of Western Hospitals
(Includes Section on Hospital Pharmacy) May 4-7, Salt Lake City, Utah. Utah Hotel

August

American Hospital Association
Annual Convention, August 24-27, New York City. Coliseum; Statler Hotel

1960

August

International Pharmaceutical Federation
August 29-September 4, Copenhagen, Denmark

American Hospital Association
Annual Convention, August 29-September 1, San Francisco. Civic Auditorium.

Barnstead Briefs

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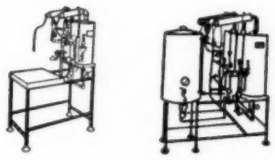


KEEPING DISTILLED WATER PURE

Contamination of distilled water often occurs through improper handling and unclean receptacles after it is received from the still. Thus the purity required for many exacting hospital requirements is ruined. An easy check for such contamination is by a conductivity type test

such as is provided by a Barnstead Purity Meter. It takes only seconds, and by making such testing routine procedure in the hospital laboratory, can prevent unnecessary trouble and delays.

OPERATING AND MAINTENANCE HINTS

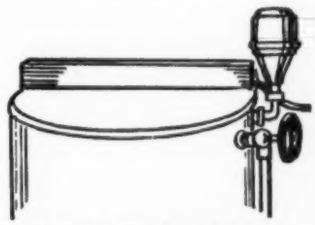
Many Hospital Technicians are concerned with the pH of distilled water. When exposed to air, distilled water will absorb the CO_2 in the atmosphere causing a decrease in its pH (increased acidity). This can be guarded against by using only freshly distilled water. If the freshly distilled water itself has a low pH, it can be increased by turning down the cooling water valve of the still. The condenser, operating at a higher heat, will drive off the CO_2 and effect an increase in pH.

FIELD REPORTS

The purification of water by demineralization (ion exchange) is generally far less expensive than by distillation, though bacteria, organics, and pyrogens are not removed by this process. Some hospitals use Barnstead Demineralizers to provide pure water for washing glassware etc., thus effecting operating savings where sterility and freedom of pyrogens is not important. Hospitals also use demineralizers to purify water before it is fed to the evaporator . . . an effective safeguard against foaming and priming.

WOULD YOU BELIEVE

80 years ago when Barnstead was first founded, distilled water was used rarely in the hospital. One use was for drinking purposes as part of a diet routine. It is of interest that Alexander Graham Bell, inventor of the telephone, ascribed his good health and 75 years of age to "a small distiller (Barnstead) from which I procure all my drinking water".



NEW PRODUCTS

Ultra-violet sterilization is employed in Barnstead's latest model distilled water storage tank. Available in all sizes, the new ultra-violet storage tank is constructed of copper and lined with pure block tin. Write for further information and for the new Hospital Catalog H to: Barnstead Still & Sterilizer Co., 31 Lanesville Terrace, Boston 31, Mass.

POSITIONS

in hospital pharmacy

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The Personnel Placement Service is operated without charge for the benefit of hospitals and pharmacist members of the American Pharmaceutical Association and the AMERICAN SOCIETY OF HOSPITAL PHARMACISTS. The ultimate purpose is the improvement of pharmaceutical services in hospitals, by more adequately fulfilling hospital pharmacy personnel needs and by locating positions which provide challenging opportunities for pharmacists who have indicated an interest in a hospital career.

By participating in the service, the hospital indicates a desire to achieve a pharmaceutical service which meets the Minimum Standard for Pharmacies in Hospitals. A description of the position should be submitted to the Division of Hospital Pharmacy on the forms provided. The hospital will receive applications directly from the applicant. The hospital agrees to reply to each application received and to notify the Division of Hospital Pharmacy when the position is filled.

The pharmacist, by participating, agrees to submit a Personnel Placement Service Information Form to the Division of Hospital Pharmacy. The applicant will then be notified of openings listed with the Service as they become available and can negotiate directly with the hospital if he is interested. It is agreed that the Division of Hospital Pharmacy will be notified as soon as a position is accepted.

A listing of positions open and wanted will be made regularly in the AMERICAN JOURNAL OF HOSPITAL PHARMACY without charge. Neither the name of the hospital offering the position nor the name of the applicant will be listed, except by code. All inquiries should be directed as shown below, including the code number.

Address all inquiries to
Division of Hospital Pharmacy
2215 Constitution Avenue, N. W.
Washington 7, D.C.

positions open

STAFF PHARMACIST—For manufacturing or dispensing in large teaching hospital; Ill. registration; excellent equipment; good hours; two weeks' vacation; sick leave; min. starting salary $470. PO-1.

CHIEF PHARMACIST—350 bed hospital. Must be eligible for licensure in N.J.; interest in manufacturing; 44 hour week, 2 weeks' vacation, salary $5,200 - $5,700. PO-6.

ASST. CHIEF PHARMACIST—209 bed general hospital—expanding to 300 beds. 40-hour week; 3 weeks' vacation. $5,000 salary. N.J. registration required. PO-18.

PHARMACIST—162 bed hospital located in Ohio. Assume complete charge of department. Prefer woman with hospital pharmacy internship. Salary open. PO-21.

ASST. CHIEF PHARMACIST—185 bed hospital. Prefer member of Seventh Day Adventist Church. PO-22.

STAFF PHARMACIST—274 bed general hospital and 172 bed maternity hospital. Calif. registration required; female preferred. Salary $525 per month; benefit program represents 17 percent base salary. PO-27.

CHIEF PHARMACIST—169 bed general hospital. S. C. registration required. Starting salary $400 with excellent opportunities for advancement. PO-28.

ASST. CHIEF PHARMACIST—315 bed community hospital located in N.Y. state. Female preferred; 40 hour week; 3 weeks' vacation. Salary open. PO-31.

ASST. CHIEF PHARMACIST—181 bed general hospital. Calif. registration required. 40 hour week; 2 weeks' vacation. Salary $450 to $500. PO-32.

STAFF PHARMACIST—550 bed general hospital located in Ohio. 40 hour week; 2 weeks' vacation. Salary $400-$450. PO-34.

STAFF PHARMACIST—259 bed general hospital. Va. registration required. Hospital pharmacy experience preferred. 40 hour week, 2 weeks' vacation. Salary open. PO-35.

STAFF PHARMACIST—216 bed general hospital. Duties include manufacturing, dispensing, inventory control and some supervision. 3 pharmacists in dept. Tenn. registration required. Salary $385-$440. PO-37.

STAFF PHARMACIST—Requirements: 1 year internship and minimum 1 year's experience. 42 hour week; 4 weeks' vacation. Salary $450 plus one meal. 660 bed teaching hospital. PO-38.

STAFF PHARMACIST—460 bed general hospital in Mass. 40 hour week; 2 weeks' vacation; other benefits. PO-40.

CHIEF PHARMACIST—120 bed general hospital. Duties include complete charge of ordering, dispensing, and assisting in purchasing. Ohio registration required. Experience in retail pharmacy given preference. 40-48 hour week; 2 weeks' vacation other benefits. PO-44.

ASST. CHIEF PHARMACIST—325 bed general hospital. Must be capable of assuming complete responsibility in absence of Chief Pharmacist. 40 hour week; 4 weeks' vacation. Salary $4500. PO-47.

ASST. CHIEF PHARMACIST—550 bed general hospital. Assume supervision of 5 pharmacists and 2 porters. N.Y. registration required, also 5 years' experience in hospital pharmacy. 35 hour week, 2 weeks' vacation, other benefits. Salary $4,500 - $5,000. PO-51.

STAFF PHARMACIST—450 bed general hospital. Requirements: B.S. in pharmacy, 1 year hospital pharmacy internship or 1 year's experience professional pharmacy, Colo. registration. 40 hour week, 2 weeks' vacation. Salary $383. PO-52.

PHARMACIST SUPERVISOR—2,700 bed state mental hospital. Va. registration required. Male with min. 1 year's experience. PO-56.

CHIEF PHARMACIST—200 bed general hospital. Hospital experience preferred. Male or female, 44 hour week, vacation and sick leave. Salary $5,500. PO-58.

CHIEF PHARMACIST—88 bed general hospital—future expansion planned. Experience in purchasing and Central Supply desired. 40 hour week. Vacation and salary arranged. PO-59.

STAFF PHARMACIST—290 bed general hospital. Ohio registration required. Capable of taking charge of dept. in absence of Chief Pharmacist. 40 hour week, 2 weeks' vacation. Salary $4,700 - $5,700. PO-60.

STAFF PHARMACIST—325 bed research hospital. Min. 2 years' experience preferably in hospital pharmacy. N.Y. registration required. Manufacturing sterile solutions and assisting in product development. Salary $4,770 - $5,860 plus benefits. Research work beyond 40 hour week available at $3.00 per hour. PO-61.

STAFF PHARMACIST—345 bed general hospital. Must have Ill. registration. Capable taking charge of dept. 40 hour week, 3 weeks' vacation, other benefits. Salary $450. PO-62.

ASST. CHIEF PHARMACIST—100 bed general hospital. Ind. registration required. Young lady preferred. Hospital experience not necessary. Main area of responsibility in Central Supply and Solution Manufacturing. 40 hour week, 3 weeks' vacation PO-63.

PHARMACIST—Animal Hospital. Duties include maintaining drug stock and checkout service, also willing to help students. 44 hour week, 4 weeks' vacation. Salary $5,000. PO-64.

CHIEF PHARMACIST—75 bed general hospital. Full responsibility for pharmacy and other hospital administrative duties. 40 hour week, 2 weeks' vacation. PO-66.

ASST. CHIEF PHARMACIST—120 bed general hospital. Must be eligible for licensure in Ark. Male or female. 40-44 hour week, 2 weeks' vacation, benefits. Salary open. PO-69.

CHIEF PHARMACIST—325 bed general hospital. Eligible for registration N.Y. Hospital experience desirable but not necessary. 40 hour week, 2 weeks' vacation. Salary depending on qualifications. PO-70.

CHIEF PHARMACIST—60 bed hospital. Hospital pharmacy experience required. Duties include Director of Pharmacy, Central Supply, purchasing agent for Medical and Surgical Supplies. 40 hour week, 2 weeks' vacation. Salary $500. NOTE: Hospital scheduled to open February 1, 1959. PO-72

ASST. CHIEF PHARMACIST—313 bed general hospital. Eligible Ky. registration. Previous hospital experience not necessary. 40 hour week, 2 weeks' vacation. Salary $400-$500, benefits. PO-73.

CHIEF PHARMACIST—265 bed general hospital. Varied duties including teaching if interested. No experience required. 40 hour week, 2 weeks' vacation. Salary $400 (approx.) plus benefits. PO-74.

STAFF PHARMACIST—335 bed hospital located in Fla. Duties include responsibilities in outpatient department and parenteral solution room. 40-44 hour week, 2 weeks' vacation, 1 meal daily. Salary $5200. PO-75

CHIEF PHARMACIST—Noe 110 bed hospital; will include 365 bed hospital to be opened in May or June, 1959. 44 hour week, 2 weeks' vacation. Salary to be negotiated. PO-76

positions wanted

PHARMACIST—Female; experience in both hospital pharmacy and retail pharmacy. Prefer southwest or mid-Atlantic area. PW-11

CHIEF PHARMACIST—Prefer general hospital in Fla. registered in Ohio and Fla.; experience in both hospital and retail pharmacy work. PW-12

CHIEF PHARMACIST—(or Asst. Pharmacist at large hospital); prefer vicinity of St. Louis; now employed as staff pharmacist at hospital; registered in Mo. PW-13

CHIEF PHARMACIST—Prefers Minn. or Calif. registered in both states. 10 years' experience government service, including commissions in U.S. Public Health Service and Navy; experience with VA as Chief Pharmacist; Ph. D. in pharmacy. PW-15

PHARMACIST—N. J. registration; prefers Pa., Fla., D.C., or Va., experience in managing retail pharmacy. PW-18

CHIEF PHARMACIST OR CHIEF PHARMACIST PURCHASING AGENT— Prefers nonsectarian and nongovernmental institution of up to 200-bed capacity or larger. Now employed. Experienced retail and hospital pharmacy. PW-19

CHIEF PHARMACIST IN A TEACHING HOSPITAL—Registered Ind., Mich., and Mo.; prefers general hospital in Midwest; experience in teaching and in hospital pharmacy. PW-26

PHARMACIST—Registered in Ohio since 1934; experience in retail pharmacy only (23 years) PW-27.

PHARMACIST—Prefers vicinity of Chicago; registered in Ill., now employed there. Graduate of Univ. of Ill. College of Phar. PW-31.

CHIEF PHARMACIST OR ASST. PHARMACIST—Prefers medium size hospital; registered in Ind., Mich., and Wis. 8 years' experience chief pharmacist and purchasing agent. Prefers Midwest or East. PW-32.

STAFF PHARMACIST—B.S. Mass. College of Pharmacy; age 27; registered in Mass. and N.H. 8 years' retail experience. PW-35.

PHARMACIST (LARGE TEACHING HOSPITAL) OR ADMINISTRATOR— Registered in Ohio; experience in retail pharmacy, hospital administration and x-ray. PW-37.

CHIEF PHARMACIST—Male, married; B.S., working on M.S. 4 years' experience hospital pharmacy. Registered Pa. PW-42.

PHARMACIST—Male, married; B.S. four years retail experience Army Dispensary. Registered N. Y. desires to locate in East. PW-44.

PHARMACIST—Graduate of Medical College of Va.; age 26; two years Marine Corps. Managerial experience. PW-45.

HOSPITAL PHARMACY INTERN—Graduate of Univ. of Wash. has completed military service. Prefers northwest. PW-46.

STAFF PHARMACIST—Graduate Howard Univ. College of Pharmacy; limited experience; anxious to learn. Any location. PW-50.

STAFF PHARMACIST—Graduate George Washington College of Pharmacy; extensive retail pharmacy experience. Prefers. D.C. or Fla. PW-52.

CHIEF PHARMACIST—Prefers middle West; registered in Ill., female, single; graduate of Univ. of Ill. College of Pharmacy; now employed as Chief Pharmacist. PW-61.

CHIEF PHARMACIST—M.S. degree in hospital pharmacy; prefers East; male, single; extensive experience, including pharmacy and administrative officer in Air Force. PW-62.

STAFF PHARMACIST—Completed military requirements; experienced in hospital pharmacy; prefers mid-Atlantic area, single. PW-63.

CHIEF PHARMACIST—Registered in Tenn., La., Tex.; prefers South; graduate Univ. of Tenn., School of Pharmacy. PW-64.

PHARMACIST—Desires position Baltimore area; prefers small hospital; experience includes 21 years as owner-manager of retail store. PW-65.

INDIAN PHARMACIST—Desires appointment to obtain higher training in hospital pharmacy; graduate Madras Univ.; 1½ years' experience in 1,000 bed hospital, including inpatient and outpatient dispensing, parenteral and general manufacturing and administration. PW-68.

CHIEF PHARMACIST—Male, married; B.S., Ph. G., now employed chief pharmacist. Prefers South or Southwest. Registered Ala. and Va. Desires administrative work along with pharmaceutical. PW-70.

CHIEF PHARMACIST—Male, married. B.S. 3 years' hospital experience; Registered N. Y. and Vt.; desires to locate in N. Y. or adjoining state. PW-71.

STAFF PHARMACIST—Female, married; internship at Freedman's Hospital; experience in hospital pharmacy. B.S. prefers D.C. area. Registered in Ind., D.C. and N. C. PW-72.

CHIEF PHARMACIST—Female, single; hospital experience. Desires position 100 bed hospital. B.S. Registered Ky. Prefers Ky. PW-73.

HAITIAN STAFF PHARMACIST—Male, married. Has 5 years' hospital experience. Present owner of pharmacy. Desires to locate in northwest U.S. PW-74.

ASST. CHIEF PHARMACIST—Male, married. Registered in Calif. and Wash. Background of drug company representative, retail pharmacy and now employed in Clinic and Research Foundation as Chief Pharmacist. Prefers Pacific states or Ariz. Location. PW-76.

CHIEF PHARMACIST—Male, single, B.S. and M. S. in Hospital Pharmacy. Serving hospital pharmacy internship. Prefers Midwest or East. PW-77.

CHIEF PHARMACIST—Male, married, registered N.Y. and Pa. Extensive hospital pharmacy experience. Now employed as assistant director of pharmacy. Prefers eastern part of country. PW-78.

ASST. PHARMACIST—Male, married. Registered Minn. 10 years' hospital experience. Desires midwest location. PW-79.

CHIEF PHARMACIST—Male, married, registered Mass., Conn., and Calif. 6 years' retail and 4 years' hospital experience. M.S. hospital pharmacy. Desires northeast location. PW-81.

PHARMACIST—Self-employed retail pharmacy for 20 years. Ph. G. degree; registered N. Y. 3 years' hospital experience. Prefer locate N. Y. PW-84.

CHIEF PHARMACIST—16 years' hospital pharmacy, now employed Chief pharmacist. Female, single. Registered Mich. and Ill. Prefers locate midwest. PW-85-A.

STAFF PHARMACIST—4 years' hospital pharmacy experience; prefers Wash. state (registered). Female, married. B.S. pharmacy. PW-87.

IRANIAN PHARMACIST—Desires opportunity to continue hospital pharmacy studies; single, age 30; excellent academic background; now studying industrial chemistry. Prefers location in west or northwest. PW-88.

ASST. CHIEF PHARMACIST—Female, single; B.S. 1 year hospital pharmacy internship; registered Okla. Prefers west or southwest. PW-89.

ASST. PHARMACIST—Female, married. Educated and trained in Philippines. Served hospital internship. Registered Manila. Desires to locate east coast of U.S. PW-91.

CHIEF PHARMACIST—Prefers large hospital. Male, married; registered N.H., Mass., Calif. 10 years' VA hospital experience. PW-92.

CHIEF PHARMACIST—Prefers small hospital in Ohio. Male, married; B.S.; registered Ohio. Excellent academic and professional background. PW-93.

STAFF PHARMACIST OR ASST. CHIEF—Female, single. Filipino, educated and trained Philippines. 10 years' hospital experience. Served hospital pharmacy internship. PW-95.

STAFF PHARMACIST—Male, single. Registered Del. Desires Mid-Atlantic area. Completed hospital pharmacy internship. PW-96.

STAFF PHARMACIST—23 years' retail pharmacy experience, 7 years' hospital experience. Female, registered in and prefers Va. PW-97.

STAFF PHARMACIST—Completed internship July, 1958. Registered D.C. Male, desires to locate in east or midwest. PW-98.

STAFF PHARMACIST—Several years of both retail and hospital pharmacy experience. Male, married. Registered Ohio and Ky. Desires to locate in either state. PW-99.

ASST. PHARMACIST—Male, married. Registered Tenn. and La. Retail pharmacy experience only. Desires to locate in south. PW-100.

STAFF PHARMACIST—Male, married B.S. registered D.C. Desires to locate midwest or west. 2 years as instructor in pharmacy plus retail and laboratory experience. PW-101.

PHARMACIST—Male, married. Registered Ill. Desires to locate in New England. PW-102.

CHIEF PHARMACIST—Male, married. Registered N.J., and Pa. Retail and hospital pharmacy experience. PW-103.

STAFF PHARMACIST—Single female, registered Mo. B.S.; hospital pharmacy experience. Desires locate midwest. PW-104.

PHARMACIST—Male, married, 20 years' experience retail pharmacy. Registered Pa., desires to locate in Philadelphia. PW-105.

CHIEF PHARMACIST—Male, married. 3 years' hospital experience, plus retail. Registered Wis., desires locate Seattle area. B.S. pharmacy and chemistry. PW-106.

PHARMACIST—Filipino, female. B.S. pharmacy, Univ. of Philippines. Desires locate Washington, D.C. PW-107.

STAFF PHARMACIST—Male, single. Registered Del. Served hospital pharmacy internship. Presently employed as Staff Pharmacist. Prefer east. PW-109.

STAFF PHARMACIST—Male, single. Served hospital pharmacy internship, plus 2 years U.S. Army pharmacist. Registered Washington, D. C. PW-110.

CHIEF PHARMACIST—Female, single, registered Penna. 12 years' experience Chief Pharm. Desires to locate in Penna. or Ohio. PW-111.

STAFF OR ASST. CHIEF PHARMACIST—Male, single, registered Mass. Retail experience plus 2 years hospital corpsman USN. Desires to locate around Boston, Mass. PW-112.

CHIEF OR ASST. CHIEF PHARMACIST—Male, married, registered Mich. and Ariz. Served hospital pharmacy internship. Retail experience plus 7 years' hospital pharmacy experience. PW-113.

STAFF PHARMACIST—Male, married, registered Mass. Retail and hospital pharmacy experience. Desires locate east or northeast. PW-114.

CHIEF OR STAFF PHARMACIST—Female, single, registered Tex. Desires to locate in east. PW-115.

STAFF PHARMACIST—Female, single. B.S. Retail experience only. Registered Fla. PW-116.

ASST. CHIEF PHARMACIST—Male, single. B.S. Vet. Adm. Hosp. experience. Registered Va. and Washington D.C. PW-117.

STAFF PHARMACIST—Male, married. B.S. Registered La., Va., and Washington, D.C. PW-118.

ASST. DIRECTOR OR DIRECTOR OF PHARMACY SERVICES—Male, single, B.S. Retail and 4 years' hospital experience. Registered Ill. PW-119.

ADMINISTRATOR—Male, married. D. Sc. 15 years hospital pharmacist. Desires locate Florida. PW-120.

PHARMACIST—Male, single. B.S. Registered Maine. Served hospital pharmacy internship. PW-122.

CHIEF PHARMACIST—Male, single. Registered Conn. and N.J. 10 years' hospital pharmacy experience. B.S. PW-123.

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